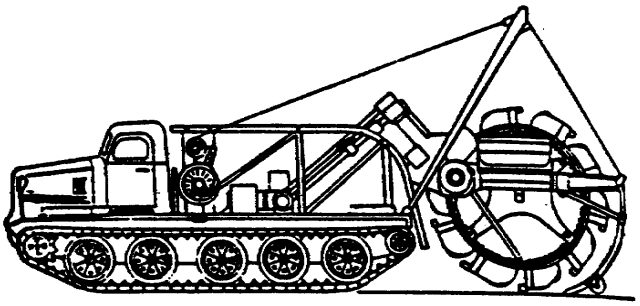
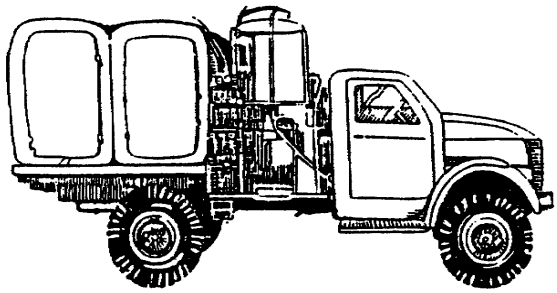
SUBCOURSE
IT0638

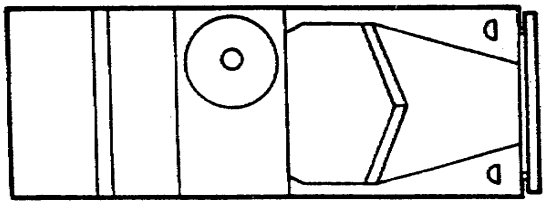
EDITION
B

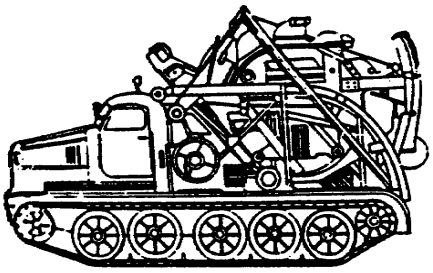
US ARMY INTELLIGENCE CENTER

IDENTIFY ENGINEER AND DECONTAMINATION EQUIPMENT ON AERIAL IMAGERY









THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT
ARMY CORRESPONDENCE COURSE PROGRAM

AIPD
READINESS/ PROFESSIONALISM
THRU GROWTH

IDENTIFY ENGINEER AND DECONTAMINATION EQUIPMENT ON AERIAL IMAGERY

Subcourse Number IT 0638

EDITION B

US Army Intelligence Center
Fort Huachuca, Arizona 85613-7000

6 Credit Hours

Edition Date:

SUBCOURSE OVERVIEW

This subcourse is designed to teach you basic procedures involved with the identification of engineer and decontamination equipment on aerial imagery using basic imagery analysis principles and techniques. Contained within this subcourse are descriptions and characteristics of types of mine laying, mine detection, and mine clearing equipment; and construction and decontamination equipment.

There are no prerequisites for this subcourse.

This subcourse reflects the doctrine which was current at the time the subcourse was prepared.

TERMINAL LEARNING OBJECTIVE

TASK: You will use the elimination process in identifying types of mine laying, mine detection, and mine clearing equipment; and construction and decontamination equipment.

CONDITION: You will have access to extracts from FM 1-402; FM 5-100; FM 100-2-1; FM 100-2-3; STP 34-96D1 -SM; STP 34-96D24-SM-TG; TM 30-326, Vol 1; 10th RTS NATO Equipment Recognition Keys; Jane's Military Vehicles and Ground Support Equipment; and soldat und Technik's Erkennungsblaetter.

STANDARD: You will identify types of mine laying, mine detection, and mine clearing equipment; and construction and decontamination equipment on aerial imagery in accordance with (IAW) FM 1-402; FM 5-100; FM 100-2-1; FM 100-2-3; STP 34-96D1-SM; STP 34-96D24-SM-TG; 10th RTS NATO Recognition Keys; Jane's Military Vehicles and Ground Support Equipment; and Soldat und Technik's Erkennungsblaetter.

NOTE: River crossing equipment Identification is described in Subcourse IT 0680.

ACKNOWLEDGEMENT: Special thanks go to Jane's Information Group for permitting us to use certain line drawings and data from Jane's Military Vehicles and Ground Support Equipment published by Jane's Information Group.

Furthermore, special thanks go to the Streitkraefteamt (German army) for permitting us to use certain line drawings and data from Soldat und Technik's Erkennungsblaetter (Soldier and Technique Recognition Pages/Keys), published by Redaktion Karl heinz Mende, Bonn, West Germany.

NOTE: Replace the following pages with the glossy photo pages attached to the back of this subcourse for better viewing: E-3, E-4, E-6, E-7, E-8.

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LESSON 1

GENERAL ENGINEER DOCTRINE AND SUPPORT

CRITICAL TASKS: 301-338-1808
301-338-3701

OVERVIEW

TASK DESCRIPTION:

In this lesson you will learn to recognize NATO and non-NATO engineer doctrine and support.

LEARNING OBJECTIVE:

ACTIONS: Use the information provided in recognizing NATO and non-NATO engineer doctrine and support. .

CONDITIONS: You will be given extracts from FM 5-100, FM 100-2-1, and FM 100-2-3.

STANDARDS: You will recognize NATO and non-NATO engineer doctrine and support lAW FM 5-100, FM 100-2-1, and FM 100-2-3.

REFERENCES: FM 5-100
FM 100-2-1
FM 100-2-3.

INTRODUCTION

The US Army is challenged by a variety of threats throughout the world. It must be prepared to fight battles of great scope, range and intensity. It must be prepared to counter large modern ground forces, eg., Iraq as well as light forces, insurgents, and terrorist groups. Threat forces require significant engineer support and our imagery analysts (IAs) must be able to identify threat forces countermine, counter obstacle, gap-crossing, and combat route operations.

PART A: US ENGINEER DOCTRINE AND SUPPORT

1. Engineer elements within the operational battle concept. Operational battle doctrine recognizes that superior combat power derives from artful combinations of movement, firepower, protection, and intelligent leadership in a sound operational plan.

a. Effective maneuver is the first element of superior combat power. Commanders maneuver combat systems into positions of advantage. Maneuver depends upon mobility inherent in units and weapon systems. Mobility is essential to gain and retain the initiative, mass forces, exploit success, preserve freedom of action, gain surprise, reduce vulnerability, and avoid unnecessary costs in soldiers and materiel. On modern battlefields, a major engineer mission is to provide mobility support for maneuver forces so they can move rapidly under fire. Commanders must use engineer support to breach obstacles and mines rapidly and to preserve the freedom to maneuver. Engineers also counter the mobility of the enemy by creating obstacles.

b. The second element is effective firepower. Fires must be massed against the enemy at the right times and places. Weapon systems must be positioned rapidly on the battlefield. When missions require, engineers may assist in preparing artillery positions and constructing fighting positions for other weapons. But above all, engineers contribute to effective firepower by developing targets. A good terrain analysis will reveal likely enemy routes. Mines and obstacles integrate with the terrain, and they support direct and indirect fire. Properly employed, obstacles and mines will slow or stop enemy maneuver or channel enemy movement, thus increasing enemy vulnerability.

c. The third element of combat power is effective protection. It includes cover, concealment, deception, and operations security. Engineer survivability operations protect the force by preparing weapon emplacements, vehicle fighting positions, and shelters. Combat orders should task the engineers with specific survivability missions.

d. The final element of combat power is effective leadership. Unit commanders and staff must employ engineers efficiently and effectively. Maneuver, firepower, and engineer and combat arms preparation of the battlefield must be fully integrated and mutually supporting. Training must emphasize leadership. Future battlefields may be violent and lethal. Combat engineer leaders may operate in environments of extreme stress.

2. The US engineer system consists of engineer assets in divisions, corps, and echelons above corps areas. These areas either support or serve in the combined arms team in all combat operations and in diverse environments. The systems' organizations are flexible and responsive.

They are tailored to the forces they support. Normally, they support forward, committed maneuvered elements, but they can be shifted to weight the effort at critical times and places. The system provides a combat multiplier that reinforces terrain to the advantage of friendly forces.

a. Missions. The engineer system has five primary battlefield missions: mobility, countermobility, survivability, general engineering, and topographic engineering. Engineers also fight as infantry when required. For success in battle, supported maneuver force commanders use engineers in these missions. In these operations, alone or in cooperation with other units, they perform tasks in each of the functional areas shown in Table 1-1.

Table 1-1. Primary Battlefield Missions and Functional Areas.

MOBILITY	GENERAL ENGINEERING
Countermine	Lines of Communication
Counterobstacle	Construction and Repair
Gap-Crossing	Logistics Facilities Support
Combat Roads and Trails	Area Damage Control
Forward Aviation Combat	Construction Material Production
COUNTERMOBILITY	**TOPOGRAPHY**
Mine Warfare	Terrain Analysis
Obstacle development	Map Production and Distribution
SURVIVABILITY	
Fighting Positions	
Protective Emplacement	
Protected Support Facilities	

b. Purpose. Mobility support enables commanders to maneuver combat assets to gain decisive action. To maintain mobility on battlefields, our countermine, counterobstacle, and gap crossing capabilities must be sound and well drilled. To preserve mobility during nuclear warfare, engineers will have heavy work loads making emergency repairs, removing debris, and conducting reconnaissance.

(1) To prevent the enemy from achieving objectives, enemy movement must be impeded-delayed, disrupted, dispersed, channelized, or stopped. Slowing enemy movement creates opportunities that friendly forces can exploit. Mines and obstacles may be used frontally and in depth in enemy territory in order to degrade mobility and weaken offensive or defensive manpower capabilities. Opportunities for exploitation must be made in both the deep and close battles.

(2) Engineers dig and construct fighting and protective positions beyond the capabilities of supported maneuver and support elements. They provide general engineering support to rear areas to sustain forward combat operations. They provide topographic support such as terrain analysis, maps, and digital terrain data so that US forces can use terrain wisely.

c. Deception must support, and be integral to, operational planning. Deception consists of actions taken to mislead enemies by manipulating, distorting, and falsifying information in order to induce them to react against their own interest. Camouflage, screening smoke and dummy positions and decoys can be used effectively to help gain surprise for the attacking force. Deception can include the construction of dummy defensive positions, or false attack preparations in a place other than the planned point of attack. Although it is a unit responsibility, the engineers may construct fighting positions, install dummy equipment, and emplace dummy minefields (Figure 1-1).

Figure 1-1. Example of Dummy Equipment.

3. Engineer units range in size from small specialized teams to large engineer commands. The variety of engineer units allows the flexibility for tailoring support to the needs of the supported command.

a. The command HQ is organized under a table of organization and equipment (TOE). Engineer commands are flexible with a headquarters and headquarters company (HHC) and at least two or more engineer brigades.

b. Engineer brigades, like engineer commands, are flexible. Organized under a TOE, each brigade has an HHC and two to four attached engineer groups. Engineer brigades are assigned to the theater Army, but may be attached to an engineer command, a corps, or an airborne corps. In the absence of the engineer command, the theater Army brigade commands and coordinates the activities of engineer units operating in the communications zone.

c. The basic TOE engineer units are combat, topographic, and composite battalions. Battalions are employed when it is desirable to assign complete control of a task or an area to a unit. In a theater, five engineer battalions are usually needed to sustain a deployed division.

In addition to the divisional engineer battalion, the other four battalions can be any combination of combat battalions, corps; combat battalions, heavy; or composite battalions.

d. Engineer combat battalions. Division, corps, and engineer combat battalions, heavy, normally have fixed organizations. Generally, they consist of an organic HHC, several operating or line companies, and support companies. An operating or line company has a company HQ or HQ platoon and two or more operating platoons. A support company may be organic, supplementing the operating or line companies with specialized equipment and personnel.

e. Engineer battalions, division. Each division has an organic engineer battalion organized and equipped to support its operations. The battalion is tracked or wheeled to move with its division. Each has an HHC and three or four line companies.

f. Engineer combat battalions, corps. These battalions are assigned to corps with normal attachment to an engineer brigade or group. Battalions consist of an HQ, an HHC, and four line companies. There are wheeled and mechanized versions of the battalion.

g. Engineer combat battalions, heavy. These battalions are normally assigned to an engineer brigade in the corps rear area or in the communications zone. They have many pieces of large engineer equipment. Their earth moving capabilities may be effectively used in digging antitank ditches.

h. Engineer topographic battalion provides terrain analysis, map distribution, and production (cartography, reproduction, and topographic survey) to all army units of the theater Army.

i. Separate companies may be organic to separate infantry and light infantry brigades, separate armored and mechanized infantry brigades, separate airborne brigades, and armored cavalry regiments. Other separate engineer companies include:

- Atomic demolitions munitions
- Assault bridge, mobile
- Assault float bridge, ribbon
- Medium girder bridge
- Panel Bridge
- Float bridge (M4T6 or Class 60)
- Light equipment, airborne
- Combat support equipment
- Construction support

- Port construction
- Pipeline construction support
- Dump truck.

PART B. NON-NATO ENGINEER DOCTRINE AND SUPPORT

1. The Commonwealth of Independent State (CIS) recognizes that execution of combined arms operations requires extensive use of engineer support. This support is influenced by the requirement to maintain high speed offensive operations, and the increased lethality of conventional and nuclear weapons.

2. There are two types of CIS engineers: sapper, or combat engineers found at regiment and division, and more skilled engineers organized and trained for specific missions. The latter type of engineer normally is organic to Army and Front.

3. Engineer troops are assigned down through regimental level in all CIS maneuver divisions, and platoons are sometimes detailed to battalions for specific operations. At Army level, engineer units could include a pontoon bridge regiment, an assault crossing battalion, and a general engineer regiment or brigade. At Front level, there might be a general engineer regiment or brigade, along with specialized pontoon bridge regiments and assault crossing battalions. Motorized rifle divisions (MRDs) or tank divisions (TDs) have an engineer battalion with various vehicle-launched bridges, pontoon bridges, and heavy amphibious ferries, along with trucks, and mineclearing, construction, and demolition equipment.

4. The basic missions of CIS engineer troops are to:

a. Construct, repair, and maintain roads, bridges, fords, and culverts.

b. Support stream and river crossings with necessary equipment.

c. Coordinate organic and attached engineer troops in water crossings.

d. Assist in emplacement of obstacles and mines. Provide technical assistance in preparation of field fortifications.

e. Conduct engineer reconnaissance and develop engineer intelligence.

f. Provide personnel and equipment for water purification and supply of potable water.

g. Assist in assault of fortified positions by furnishing sappers.

h. Provide engineer staff planning for organic and attached engineer troops.

5. The engineer company in a motorized rifle regiment (MRR) of a motorized rifle or tank division is organized into a mine warfare platoon, a technical (construction) platoon, and a bridge platoon. The company has several APCs, vehicle-launched bridges, and assorted mineclearing equipment.

6. The CIS may assign motorized rifle or other troops to perform engineer tasks when necessary. Troops of all arms and services are trained to perform some engineer tasks such as building weapons emplacements and trenches, emplacing and clearing mines by hand, and camouflaging weapons and equipment. Motorized rifle and tank regiments, however, rely heavily on their organic engineer company to--

a. Provide limited mine warfare capability.

b. Execute route reconnaissance and route opening.

c. Support crossing of water and dry gaps with truck-launched and tank-launched bridging.

d. Provide earth-moving capability for road work and entrenchments.

e. Execute camouflage and demolitions.

7. The CIS concept of engineer support includes the attachment of support units from higher levels to those front line units in contact with the enemy. Engineer unit tactical employment does not always follow strict organizational lines. Tactical employment of combat engineer, engineer reconnaissance, and road and bridge subunits generally involves the formation of one or more of the following functional groupings:

a. Mobile obstacle detachment (MOD).

b. Movement support detachment (MSD).

c. Engineer reconnaissance patrol.

8. Engineer support in the offense. The primary mission of the engineers is to assist in maintaining a high rate of advance. Emphasis is on clearing and maintaining routes for the advance of maneuver elements. This includes the clearance or removal of mines and other obstacles, assisting in water crossing obstacles, assisting in flank protection and protection against counterattacks. Engineer reconnaissance, performed independently or with other reconnaissance, plays a significant role in achieving a high rate of advance. Basic engineer tasks also include the support of logistic operations in the rear area.

a. Engineer reconnaissance. Engineers are included in all reconnaissance elements of tank and motorized rifle units. The mission of engineer reconnaissance is to report on the condition of the routes of advance for the main body. The unit performing the route reconnaissance must determine the following:

(1) Obstacles to be overcome.

(2) Engineer equipment required.

(3) Conditions of crossing sites.

(4) Location and quantity of materials which can be used to improve the march route.

(5) Nature of the terrain and the location of areas that do not afford natural concealment.

b. Engineer reconnaissance provides information about assembly areas, detours around obstacles, and warning of minefields and craters.

c. Reconnaissance of water obstacles is done to find fording sites and suitable entry and exit points for amphibious combat vehicles. Detailed reconnaissance is required for bridge and ferry sites.

d. When the situation warrants, engineer reconnaissance patrols are formed for specific missions. An engineer reconnaissance patrol may consist of one or two BRDM scout cars or APCs. Reconnaissance of tank fording sites require divers and a tracked amphibian with river reconnaissance devices. An engineer reconnaissance patrol is equipped with portable mine detectors and route marking flags and may have a vehicle-mounted mine detector for mounted mine reconnaissance of roads and trails.

e. Movement support. Information gathered as a result of engineer reconnaissance is used to determine the selection of march routes requiring the least amount of engineering preparation and the employment of engineer assets for route clearing.

(1) The movement support function includes all engineer activities which facilitate the movement of maneuver forces. A movement support detachment (MSD) is task organized from division or regimental engineer assets based on the mission and the availability of assets. It can be from platoon to company strength and is equipped with route and mine clearing vehicles and equipment. The MSD can fill craters, clear mines, prepare bypasses from major obstructions, and identify contaminated areas. It normally does not include bridging equipment with the exception of that needed for its own movement. Maneuver regiments have their own truck- and tank-launched bridges and normally do not require bridging support from the MSD.

(2) During marches, the MSDs travel in advance of the main body clearing obstructions reported by division reconnaissance elements. The division engineer battalion can form two or three MSDs. These detachments are employed on main routes, and, where possible, under the protection of an advance guard or forward security element. On other routes, the leading regiments provide MSDs from their organic engineer resources. A common MSD at this level might consist of an engineer platoon with one or two dozers and up to three tanks fitted with dozer blades. MSDs are protected by up to a platoon of infantry or tanks and should be accompanied by chemical reconnaissance personnel.

f. Minefield breaching. The normal Soviet method of breaching minefields during an assault or rapid advance is to employ mine plows fitted to the lead tanks. Although engineers reconnoiter the minefield, the initial breaching is not primarily an engineer task. KMT-4 and KMT-6 plows normally are employed on the scale of one per platoon of three to four tanks. Engineers assist in the fitting of these and plow-roller combinations (KMT-5s) which are commonly used for minefield reconnaissance.

g. Minelaying. Minefield laying is accomplished most rapidly using armored tracked minelayers (three to each divisional engineer battalion) by special MOD teams.

Hand emplacement and towed minelayers are also utilized. An MOD consists of up to three armored tracked minelayers or truck-towed minelaying trailers and two to three vehicles carrying mines for resupply.

h. Assault river-crossings. The CIS stress that water obstacles should be crossed from the march to preclude major halts in the offense. Doctrine includes crossing these obstacles at multiple points along a broad front to overwhelm enemy defenses. Doctrine also calls for river crossings to be made at night. Engineer river-crossing capability is found at the regimental engineer company organic to motorized rifle and tank regiments, the division engineer battalion, and special engineer battalions and regiments at Front and Army level. Identification of CIS river crossing equipment is discussed in Subcourse IT 0680.

9. Engineer support in the defense. Engineer support for the preparation of defensive positions consists of the following actions:

a. Engineer reconnaissance of the enemy and terrain.

b. Preparation of fortifications for protection of weapons, personnel, and equipment.

c. Construction of obstacles.

d. Construction of routes for blocking and counter-attacking forces.

e. Support of camouflage and deception measures.

f. Provision of water supply.

g. Engineer tasks during the defense are implementation of obstacle plans, particularly antitank obstacles, to block enemy penetrations. A MOD may join antitank reserves to counter enemy tank threats. Another task for the MOD is repair of existing routes and creation of new routes to support the maneuver of forces. A third task is reacting to the effects of nuclear strikes by the enemy (fire fighting, structure repair, removal of essential debris).

h. In first echelon units, engineer fortification of defensive areas is done preferably at night, or under conditions of reduced visibility. Mechanized digging capability is used for trenches, revetments, and shelters in those areas not subject to direct enemy observation or fire.

i. To some extent fortification, shelters, and vehicle revetments are constructed by all troops. The engineers are charged with constructing the more complex fortifications. In addition, engineer troops normally construct barrier systems which are coordinated with the overall system of fire.

(1) The first priority in the barrier system is given to antitank obstacles. Additional maneuver routes for the rapid and concealed employment of counterattack or blocking forces are prepared by engineers, to include mine clearing within the defensive area, if required. For example, in establishing a prepared defense, personnel of a motorized rifle battalion in the first echelon may construct the basic trenches and company and platoon strongpoints. Basic

revetments for tanks, APCs, command observation posts, antitank guided missiles (ATGMs), and mortars may be constructed by engineers.

(2) Engineers employing digging machines may construct fortifications for the battalion's second echelon--covered shelters and bunkers, communications trenches, and alternate ATGM and mortar positions.

(3) Primary, temporary, and alternate artillery firing positions; ammunition bunkers; personnel shelters; and prime mover revetments are prepared by the gun crews. Obstacles are created on approaches into the defensive position, in front of artillery and air defense firing positions, in the undefended gaps between strongpoints, and on flanks.

(4) Antipersonnel minefields are emplaced forward of the forward edge of the battlefield area (FEBA) to give added protection to antitank minefields or to protect gaps between defensive strongpoints.

(5) Existing roads are cleared, improved, and marked. Maneuver routes to the front and flanks and supply-evacuation routes are prepared, usually by the engineer elements of the senior combined arms commander.

(6) Dummy positions may be constructed.

(7) Effectiveness of all camouflage measures is checked periodically by aerial observation.

(8) Once established by engineers, water supply points usually are operated and monitored by motorized rifle troops.

PART C: THE IMAGERY ANALYSTS ROLE IN IDENTIFYING ENGINEER EQUIPMENT

1. Engineer activity is going on at all times in a combat area. It may be carried out by manual labor or with the aid of heavy equipment. The imagery analyst (IA) becomes accustomed to this normal activity after studying a particular area for a short time and by developing a sensitivity to any increase or decrease in enemy activity. Engineer operations can be found in the vicinity of rivers, particularly near damaged or knocked-out bridges; along roads used for supply and communication; in the vicinity of critical terrain features near the forward line of own troops (FLOT) and in rear echelon areas.

2. Engineer equipment and supplies in many cases are identical to those used by civilian engineers. In this category are bulldozers, tractors, cement mixers, road scrapers, power shovels, cranes, pile drivers, road rollers, and a variety of earth-moving equipment. Shape and shadow are the two factors most helpful in identifying this type of equipment. Engineers are always concerned with moving earth; therefore, spoil marks usually are the indication of engineer activity. Engineer supply dumps can generally be identified by the types of supplies in the dump; for example, barbed wire, demolition materials, mines, boats, pontoons, and flooring for bridges.

LESSON 1

PRACTICE EXERCISE

The following material will test your grasp of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

1. What is the third element of combat power within the operational battle doctrine?

   A. Firepower.

   B. Effective protection.

   C. Effective maneuver.

   D. Effective leadership.

2. Which of the following can be used effectively to help gain surprise for the attacking force?

   A. Construction of fighting positions.

   B. Construction of fortified positions.

   C. Construction of dummy positions.

   D. Bomb craters.

3. Which plow-roller combination is used by CIS engineers for minefield reconnaissance?

   A. KMT-4.

   B. KMT-4/6.

   C. KMT-6.

   D. DIM.

LESSON 1

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

Item	Correct Answer and Feedback
1	B. Effective protection is the third element of combat power IAW US doctrine (page 1-2, para 1c).
2	C. Construction of dummy position can be used effectively to help gain surprise for the attacking force (page 4, para 2c).
3	B. The KMT-4-6 is used by CIS engineers for minefield reconnaissance (page 1-9, para 8f).

LESSON 2

IDENTIFY MINELAYING, MINE DETECTION, AND MINE CLEARING EQUIPMENT ON AERIAL IMAGERY

Critical Tasks: 301-338-1808
301-338-3701

OVERVIEW

TASK DESCRIPTION:

In this lesson you will learn to identify minelaying, mine detection, and mine clearing equipment on aerial imagery using the basic imagery analysis techniques.

LEARNING OBJECTIVE:

ACTIONS: Use the elimination process to identify minelaying, mine detection, and mine clearing equipment on aerial imagery.

CONDITION: You will be given extracts from FM 1-402; STP 34-96D1-SM; TM 30-326, Vol I; 10th TRS NATO Equipment Recognition Keys; Jane's Military Vehicles and Ground Support Equipment; and Soldat und Technik's Erkennungsblaetter.

STANDARD: You will identify minelaying, mine detection, and mine clearing equipment IAW FM 1-402, STP 34-96D1 -SM; STP 34-96D24-SM-TG; TM 30-326, Vol I; 10th TRS NATO Equipment Recognition Keys; Jane's Military Vehicles and Ground Support Equipment; and Soldat und Technik's Erkennungsblaetter.

REFERENCES: FM 1-402
STP 34-96D1-SM
STP 34-96D24-SM-TG
TM 30-326, Vol I
10th TRS NATO Equipment Recognition Keys
Jane's Military Vehicles and Ground Support Equipment
Soldat und Technik's Erkennungsblaetter.

INTRODUCTION

Mine warfare is changing rapidly. In the past, mines were emplaced by hand, which required labor, time, and extensive materials. Now they may be emplaced by hand, or planted or remotely delivered by ground equipment, high performance aircraft, fire support systems, and helicopters.

We are primarily interested in the identification of ground equipment.

PART A: MINEFIELDS AND MINE EMPLOYMENT

There are five different classifications of minefields. These include:

- Protective
- Tactical
- Point
- Interdiction
- Phony.

a. Protective minefields may be either hasty or deliberate. Hasty ones provide close-in security for units occupying a temporary position. These minefields use either hand-or machine-emplaced conventional or ground delivered scatterable mines.

b. Tactical minefields disrupt enemy formations, reduce enemy mobility, and increase the effectiveness of friendly weapons. Ground and helicopter systems delivering scatterable mines are ideally suited for this role.

c. Point minefields hinder enemy use of key areas. Mines are directly emplaced or remotely delivered. These mine fields can be used to increase the effectiveness of obstacles.

d. Interdiction minefields are placed on the enemy or in enemy rear areas to kill and to disorganize and disrupt lines of communications. They are normally delivered by high performance aircraft or fire support systems.

e. Phony minefields simulate fields in order to deceive the enemy or when the lack of time, personnel, or material prevents the employment of actual mines.

PART B: MINELAYING EQUIPMENT OPERATIONS

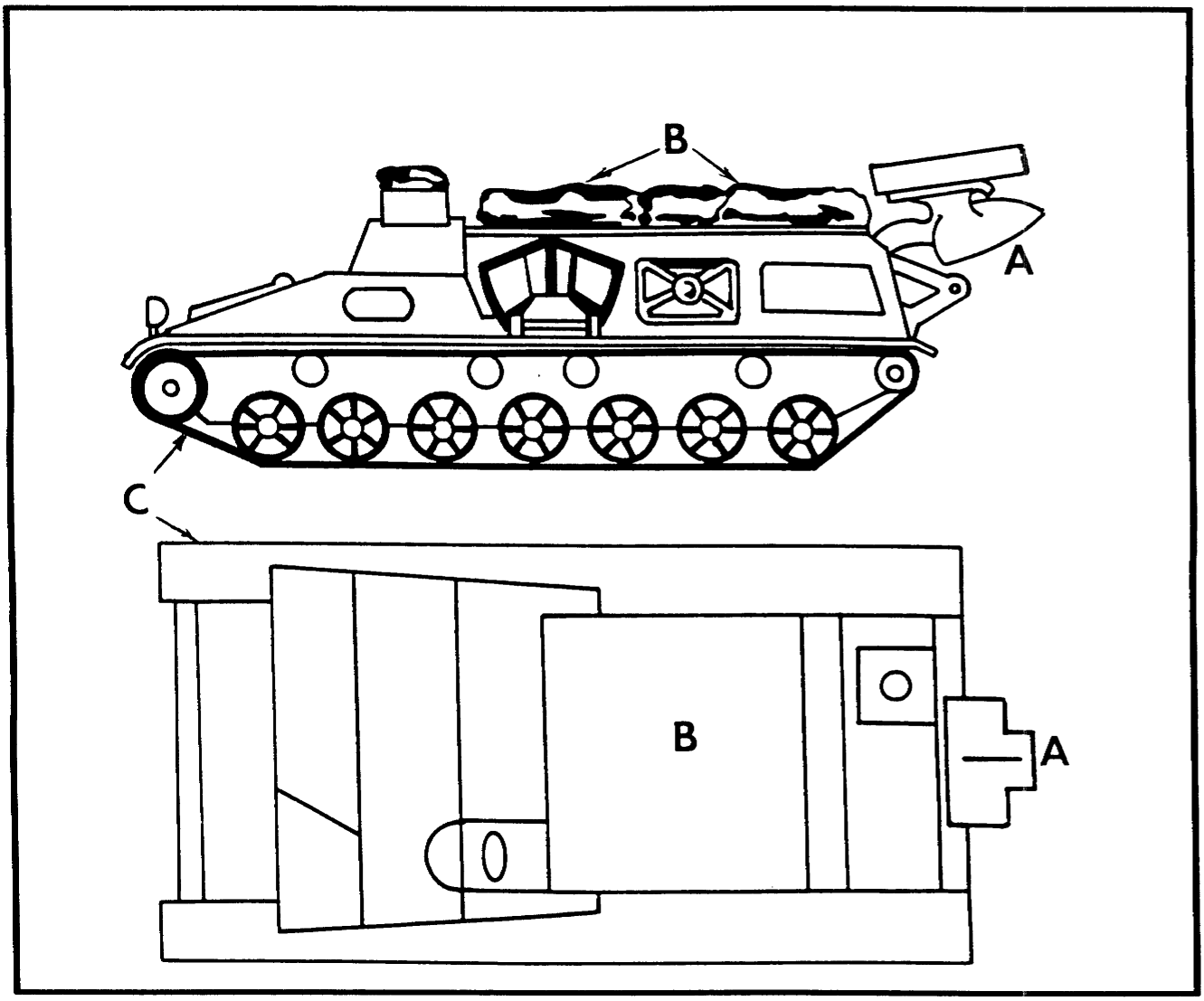
1. Mines may be buried or left on the surface. The CIS PMR-2 (Figure 2-9) deposits mines on the surface. A mechanical minelayer digs a trench, arms the mine, and then buries it. Most minelayers have the capability to bury mines or leave them on the surface, depending on which is desired.

2. The IRS PMR-2 (Figure 2-9) and PMR-3 (Figure 2-10), the French ARE minelayer, and the US M57 (Figure 2-11) are two-wheeled trailers that must be towed. The British EMI harrier defense system ranger attaches on a truck or APC (such as the FV-432 or M113).

3. The CIS has the GMZ. It is a tracked, armored SP minelayer. It uses a modified chassis as the SA-4 GANEF Transporter. The minelayer is the plow type. Each TD and MRD has 3 x GMZ assigned. The Ural-375D is also utilized with the PMZ-4 minelaying attachment.

PART C: IDENTIFICATION CHARACTERISTICS OF MINELAYERS

1. The following recognition features pertain to a typical minelayer (Figure 2-1):



Legend:

A - Plow-type minelayer
B - Mine stowage
C - Tank/self-propelled gun chassis

Figure 2-1. Identification Characteristics of Minelayers.

2. The following dichotomous-type elimination key depicts selected world mine laying equipment. Use the key as a guide only.

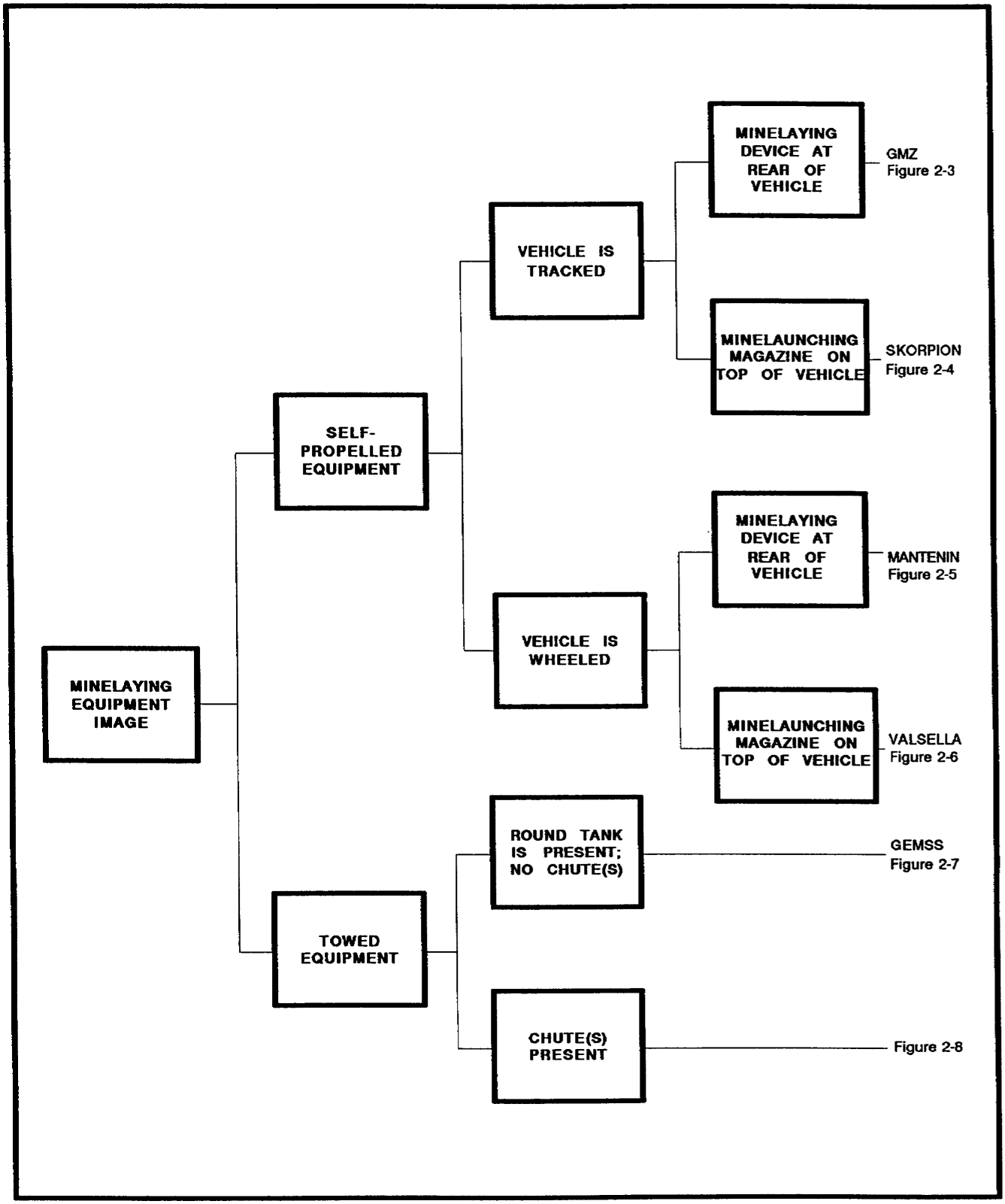

MINELAYING EQUIPMENT IMAGE
SELF-PROPELLED EQUIPMENT
TOWED EQUIPMENT
VEHICLE IS TRACKED
VEHICLE IS WHEELED
ROUND TANK IS PRESENT; NO CHUTE(S)
CHUTE(S) PRESENT
MINELAYING DEVICE AT REAR OF VEHICLE
MINELAUNCHING MAGAZINE ON TOP OF VEHICLE
MINELAYING DEVICE AT REAR OF VEHICLE
MINELAUNCHING MAGAZINE ON TOP OF VEHICLE
GMZ Figure 2-3
SKORPION Figure 2-4
MANTENIN Figure 2-5
VALSELLA Figure 2-6
GEMSS Figure 2-7
Figure 2-8

Figure 2-2.

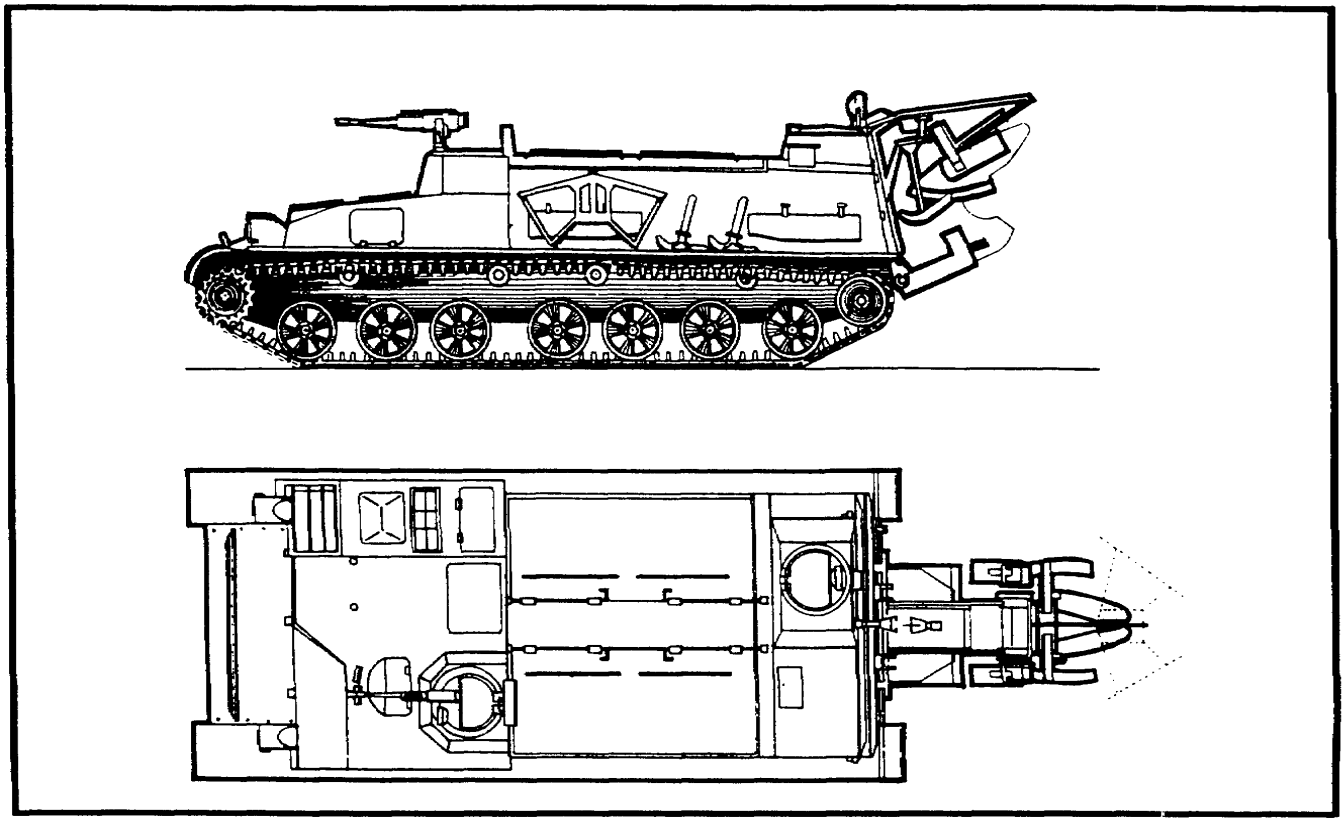


Figure 2-3. Minelayer GMZ.

Characteristics:

Associated Vehicle	GMZ (Modified SA-4 GANEF chassis) tracked vehicle
Crew	
Length	10.30 meters (m)
Width	3.20 m
Speed	
Range	
Armament	

Recognition:
Vehicle has seven road wheels.
Mine layer is plow type and mounted in rear of vehicle
This vehicle is found with the combat engineer company at an engineer battalion of a MRD o TD and the engineer company of a MRD or TR.
Origin: CIS

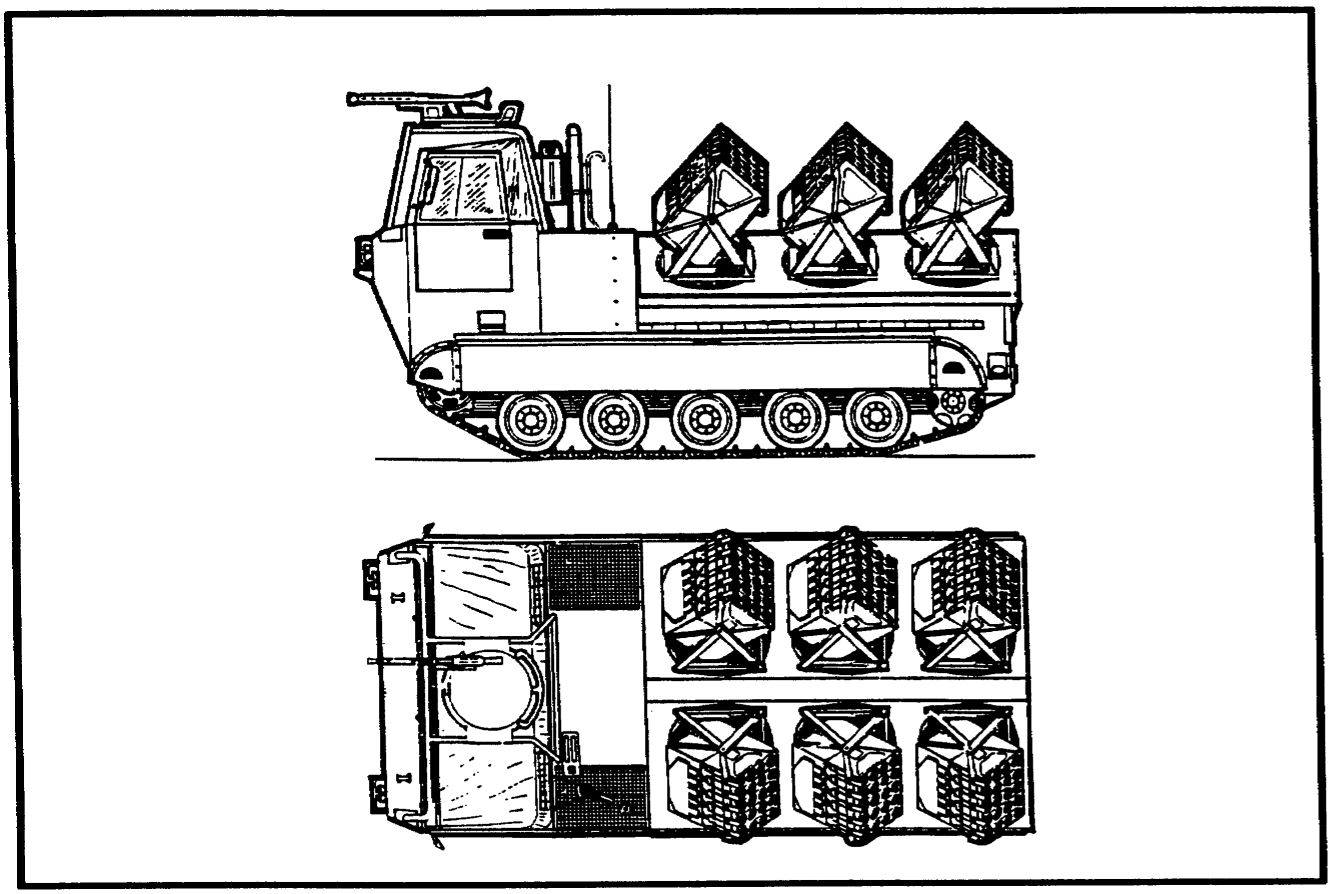


Figure 2-4. Mine Launching System Skorpion.

Characteristics:

Associated Vehicle	M548 tracked vehicle
Crew	
Length	5.85 m
Width	2.87 m
Speed	
Range	
Armament	1 x 7.62 mm MG

Recognition:

6 x mine launching units are positioned in the rear cargo/equipment area of a modified M548 tracked vehicle.
A machine gun ring mount is located center mass over driver's compartment.
The vehicle has a square exhaust vents behind both driver's and assistant drivers areas.
The M548 has same suspension as a M113 APC.

Origin: USA

User: German

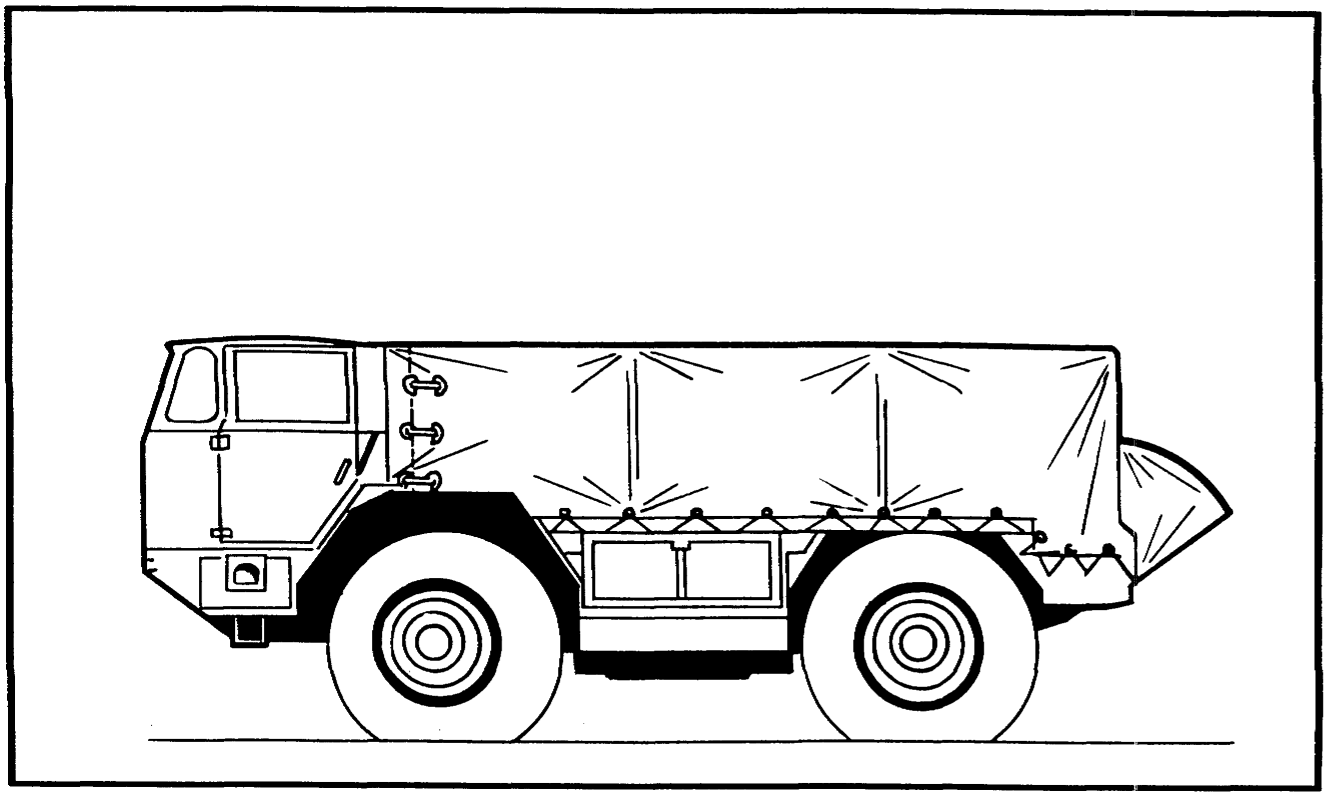


Figure 2-5. Mine Burier Mantenin.

Characteristics:

Associated Vehicle	Brier Mantenin 4x4 truck.
Crew	
Length	7.55 m
Width	2.50 m

Recognition:

Mine laying apparatus extends over rear of 4x4 wheeled vehicle.
Cab over engine vehicle.
Space between two axles.

User country: France

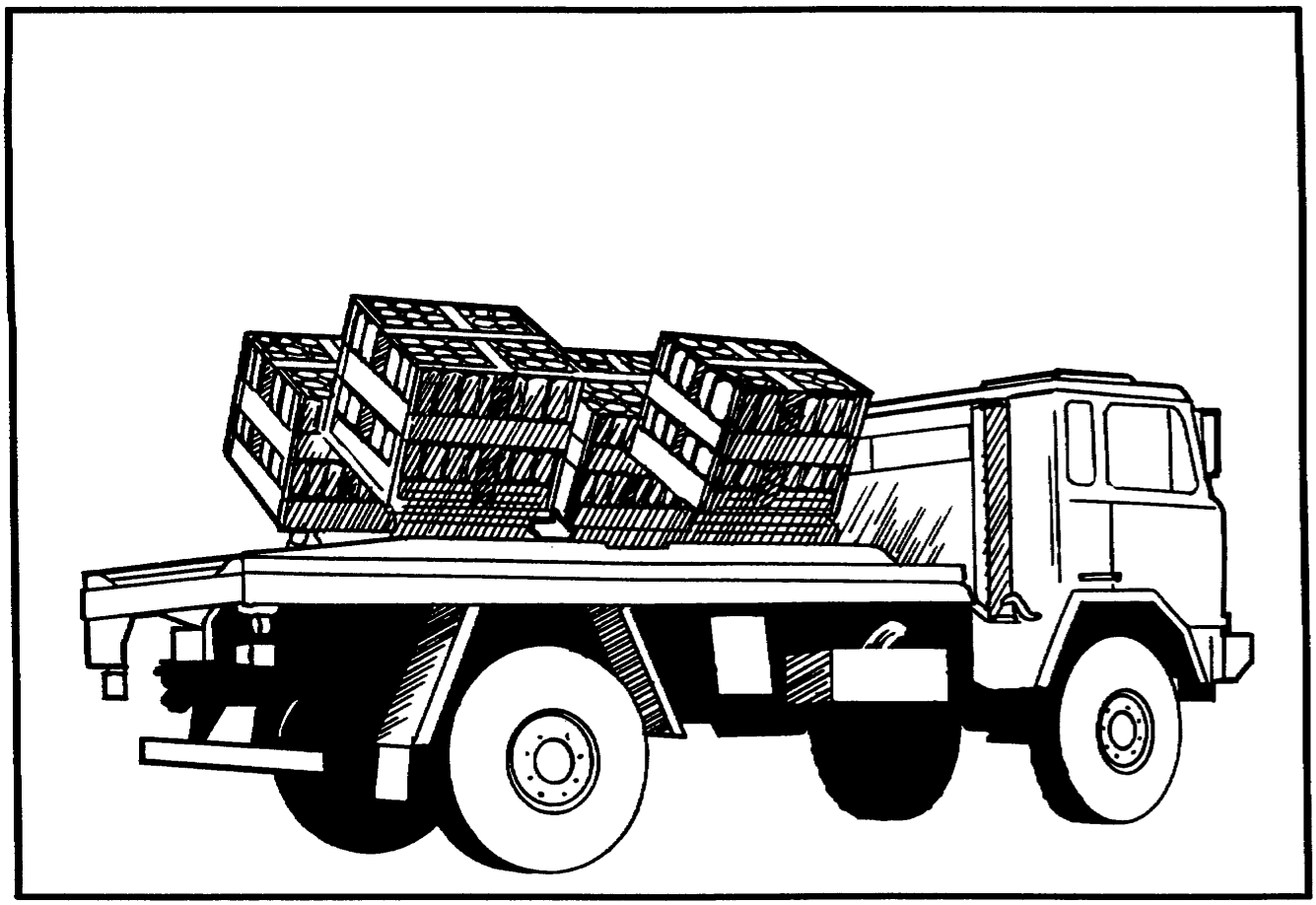


Figure 2-6. Mine Launching System Valsella-Istrice-VS-MTLU-1.

Characteristics:

Magazine launcher size: 1.15 m x 0.86m.
Equipment is mounted on self-propelled wheeled vehicle- Iveco Fiat-90-PM.
Four magazine launching units are on top of vehicle, two on each side.
Machine gun ring is on right side of cab.
Spare tire is behind cab.
Vehicle has two axles.

User country: Italy.

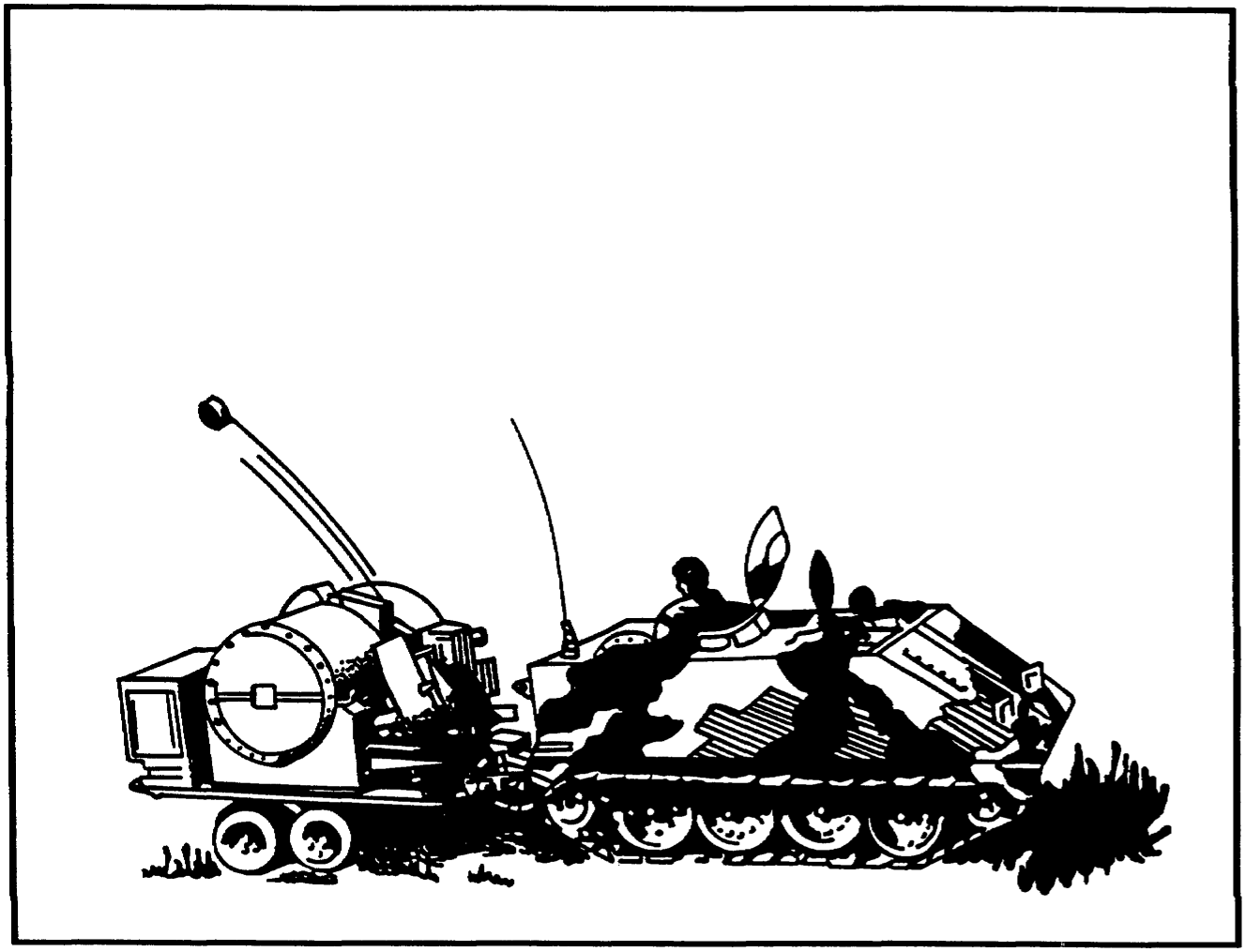


Figure 2-7. Mine Dispenser with Ground Emplaced Mine Scattering System (GEMSS) M128.

Characteristics:

Measurements are not available.
It is towed by APC M113.
It is mounted on flat bed, two axle trailer with no chutes.
Round tank is centered with box behind.

User country: US.

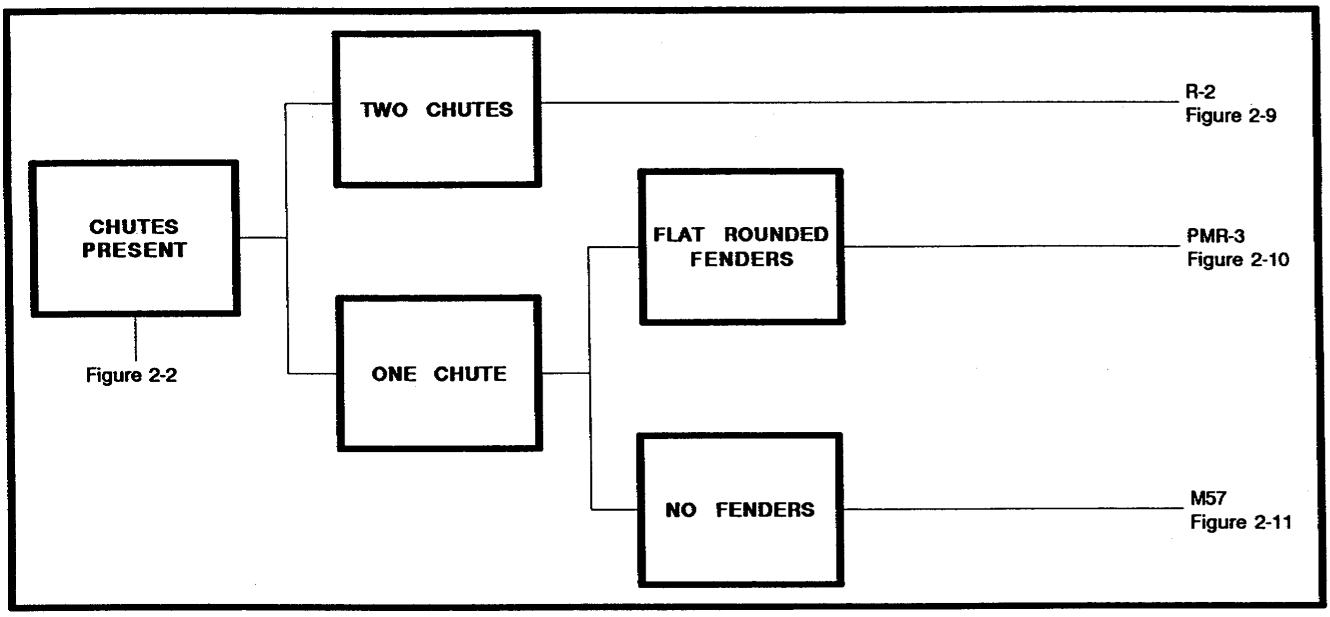

CHUTES PRESENT
Figure 2-2
TWO CHUTES
ONE CHUTE
FLAT ROUNDED FENDERS
NO FENDERS
R-2
Figure 2-9
PMR-3
Figure 2-10
M57
Figure 2-11

Figure 2-8.

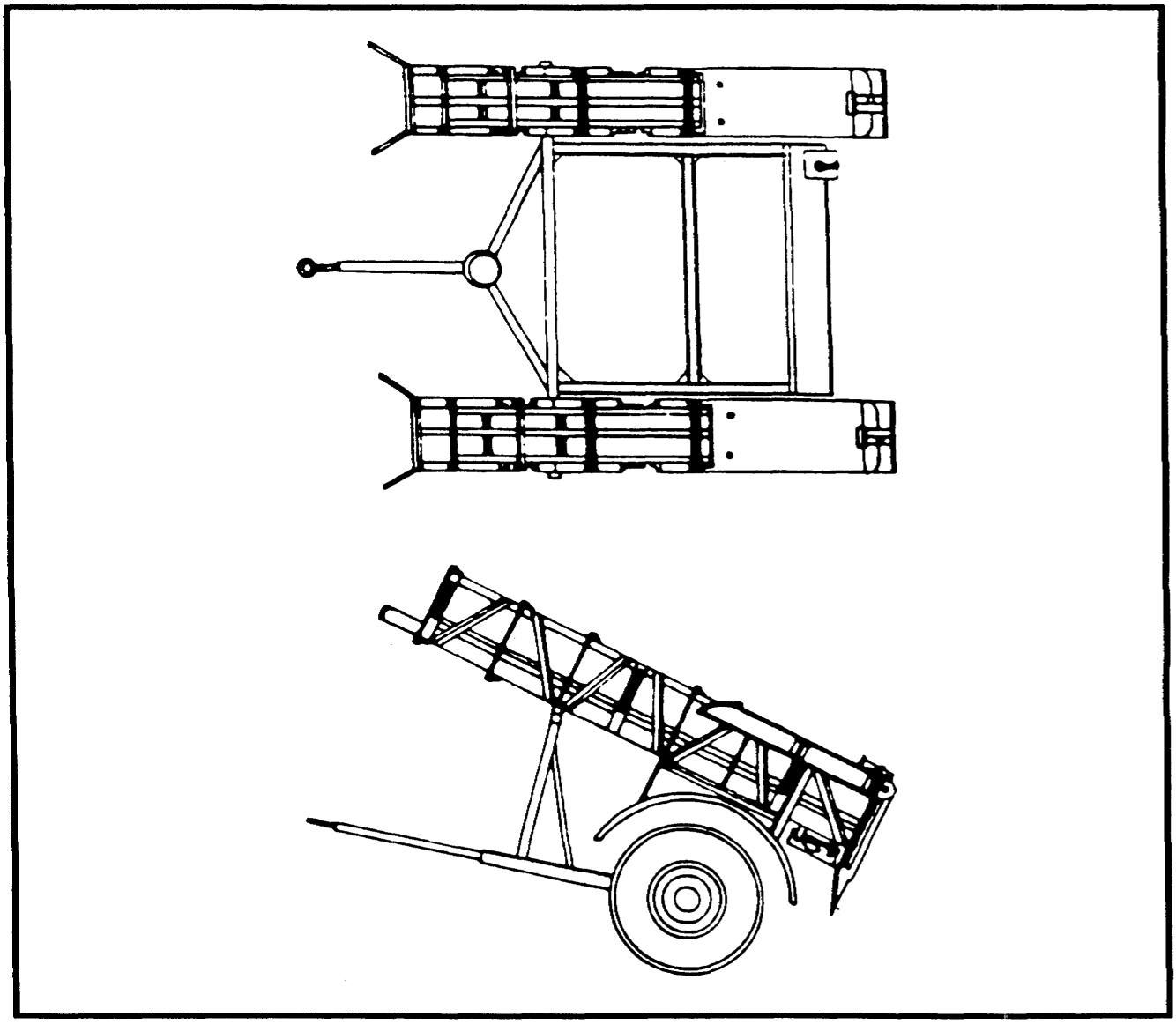


Figure 2-9. Minelayer PMR-2.

Characteristics:

3.00 m long, 2.50m wide.
Trailer is normally towed by a 6x6 truck or BIR-152.
Equipment is mounted on a two-wheeled trailer with two chutes on the outside.

User countries: Afghanistan and Eastern European countries.

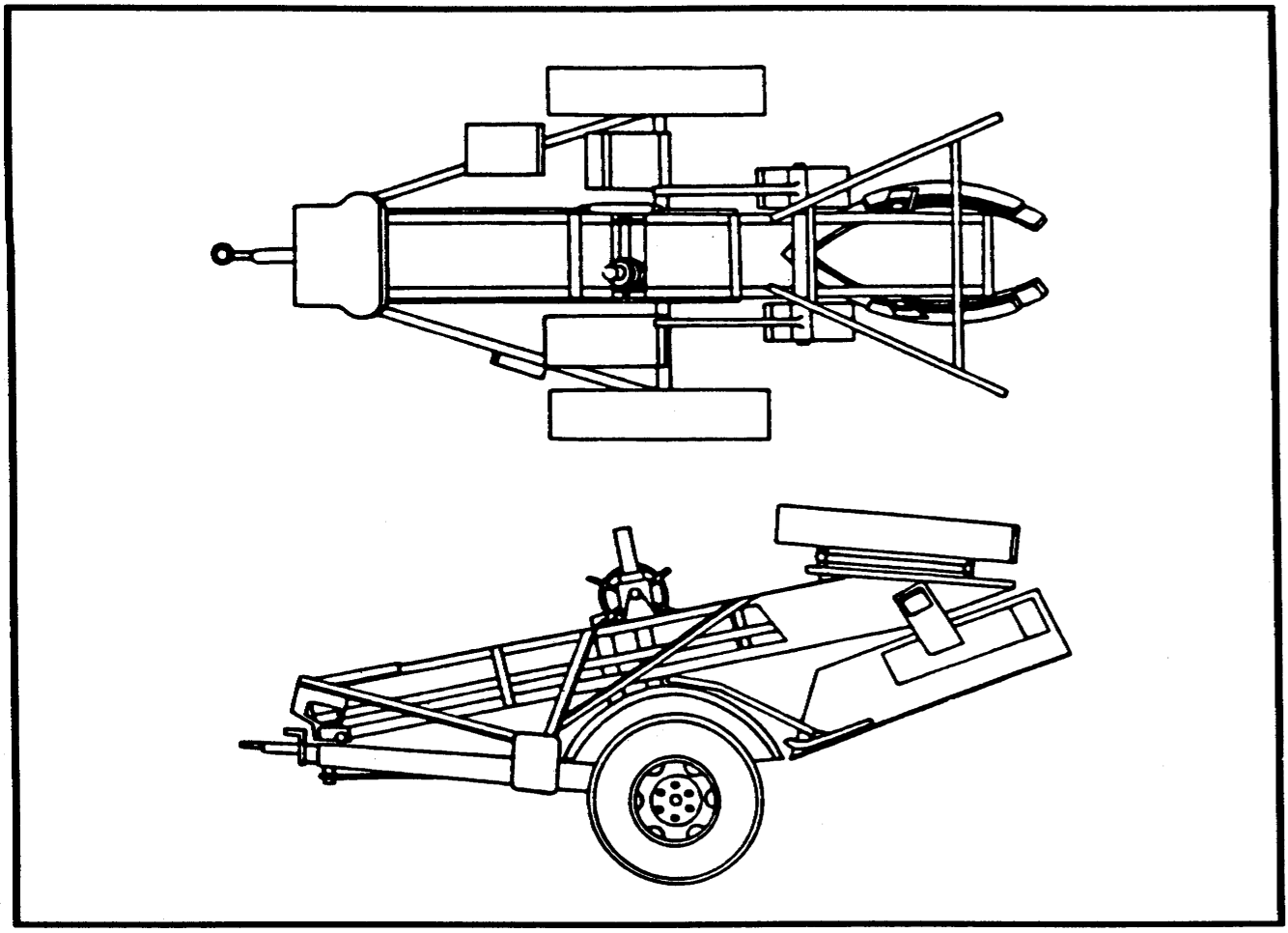


Figure 2-10. Minelayer PMR-3.

Characteristics:

3.00m long, 2.00m wide.
It is normally towed by a specially modified BTR-152.
Equipment is mounted on a two-wheeled trailer with single chute in center.
Trailer has flat, rounded fenders.
Operator is seated on trailer.

User countries: Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and CIS.

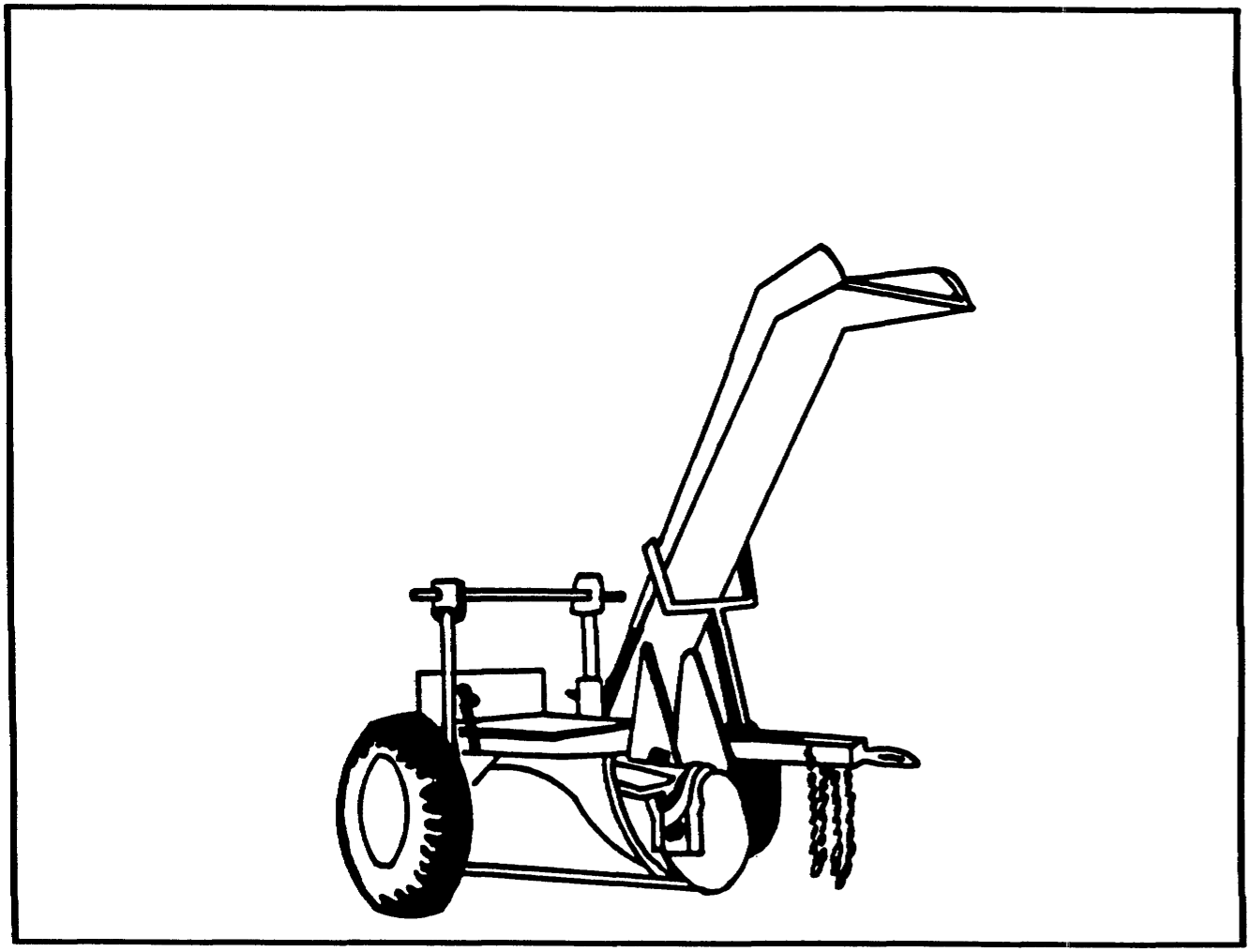


Figure 2-11. Antitank Mine Dispensing System (ATMDS) M57.

Characteristics:

4.46m long, 1.29m wide.
It is usually towed by: 2 1/2-ton truck M35, 2 1/2-ton truck M36, 5-ton truck M54, 5-ton truck M55, 5-ton 8x8 truck M656, tracked mover, and APC Ml 13.
It is a side-lift plow with side insertion mine chute.
Two-wheeled trailer has no fencers.

User country: US.

PART D: IDENTIFICATION CHARACTERISTICS OF MINE DETECTION EQUIPMENT

1. Most mine detectors are hand-operated metal detectors. Many of the newer mines are made of plastic. Therefore, new mine detection equipment had to be developed to include the capability of detecting nonmetallic mines.

2. The CIS has the DIM (Figure 2-13) which attaches to the front of a UAZ-69 or UAZ-469.

3. German has developed the MSG-1 (Figure 2-14) which also attached to the front of a light vehicle such as the DKW or ROVER. The MSG-1 uses microwave energy to detect metallic and nonmetallic mines. It consists of a metal frame that supports what appears to be a dozer blade.

4. The US has developed the vehicle mounted road detector system (VMRDS) (Figure 2-15). It is mounted in front of a vehicle such as the APC M113 or truck M151 A2. The VMRDS has the appearance of a giant sweeper. It is capable of detecting metallic and nonmetallic mines. To further aid in mine detection, the US is exploring the use of infrared rays.

5. The following dichotomous-type elimination key depicts selected world mine detection equipment; use it as a guide only.

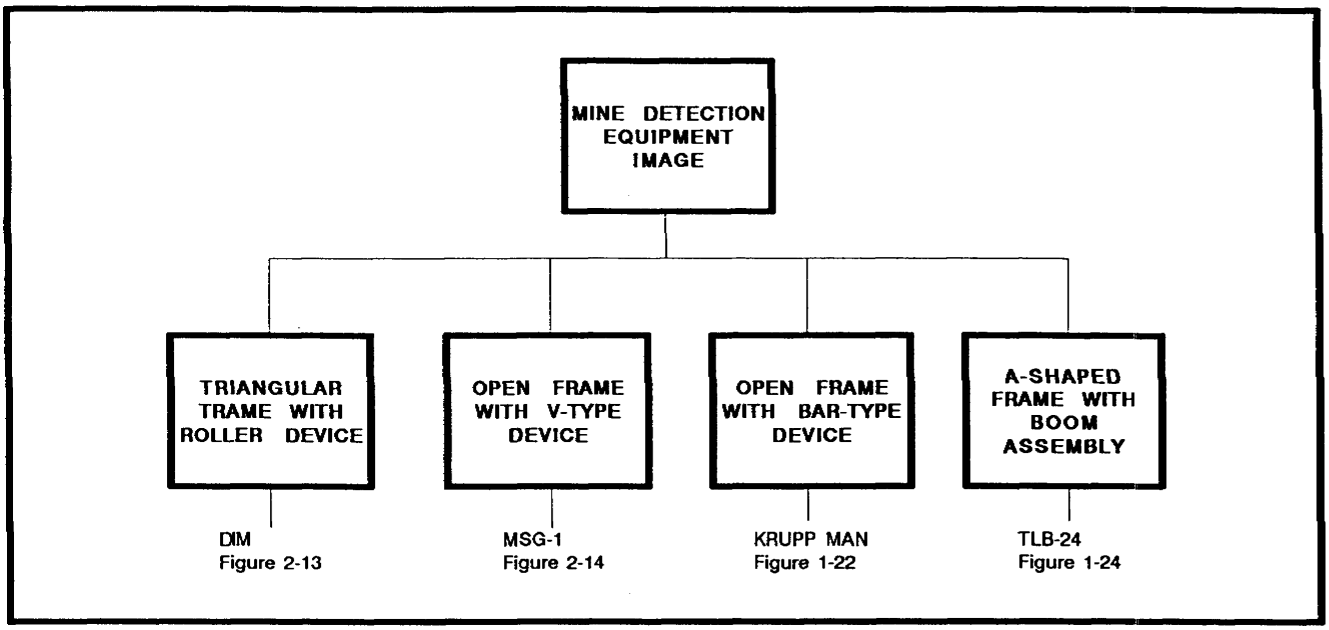

MINE DETECTION EQUIPMENT IMAGE
TRIANGULAR TRAME WITH ROLLER DEVICE
OPEN FRAME WITH V-TYPE DEVICE
OPEN FRAME WITH BAR-TYPE DEVICE
A-SHAPED FRAME WITH BOOM ASSEMBLY
DIM
Figure 2-13
MSG-1
Figure 2-14
KRUPP MAN
Figure 1-22
TLB-24
Figure 1-24

Figure 2-12.

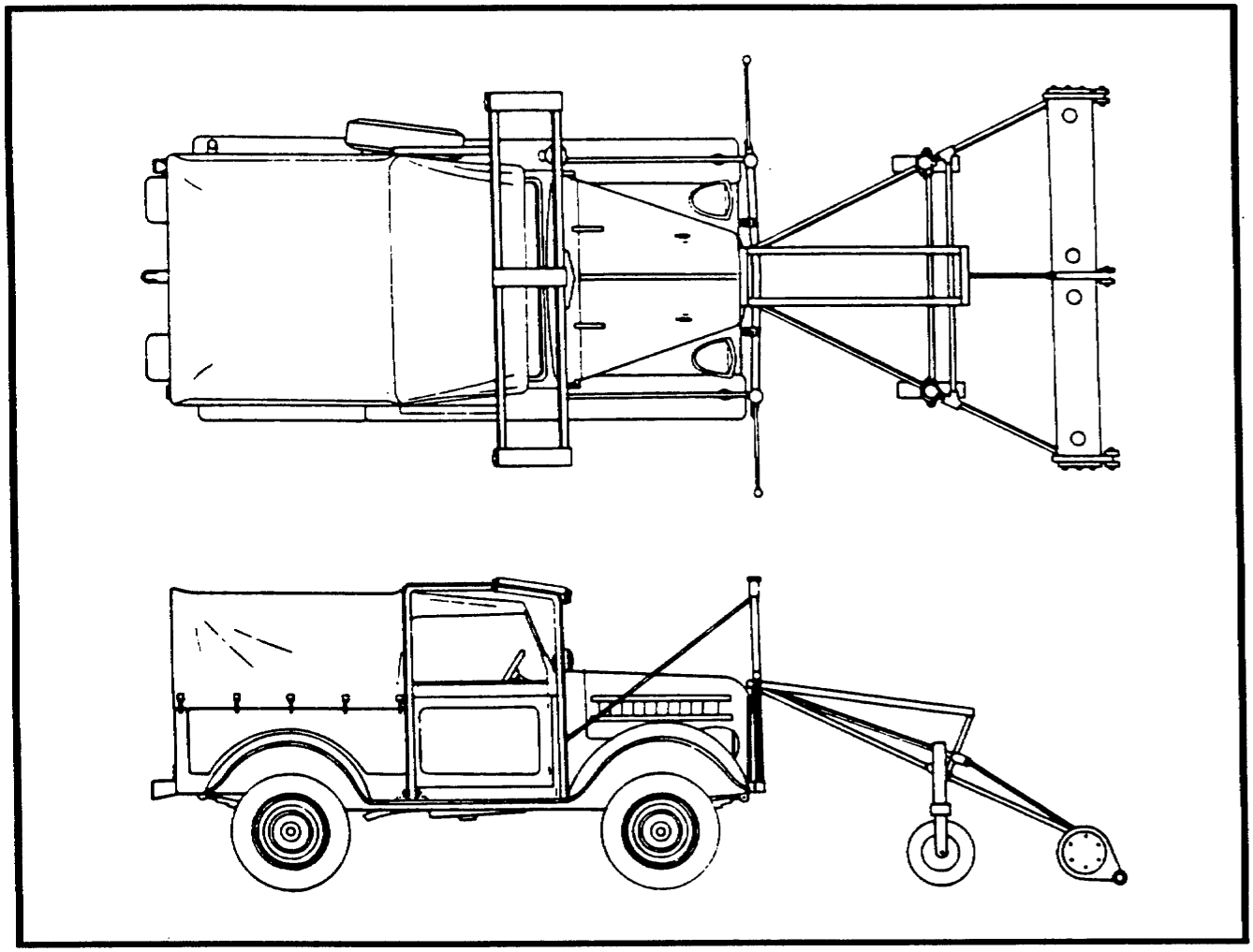


Figure 2-13. Mine Detector DIM.

Characteristics:

1.90m long, 2.00m wide (approximately).
It is usually mounted on a UAZ-69 or UAZ-469.
It is a triangular frame with roller device attached to front bumper.
In travel, it swings up and rests on hood and top of cab.
Two are assigned to the engineer battalion of an MRD and TD.

User countries: USSR, CIS, Eastern European and some Middle Eastern countries.

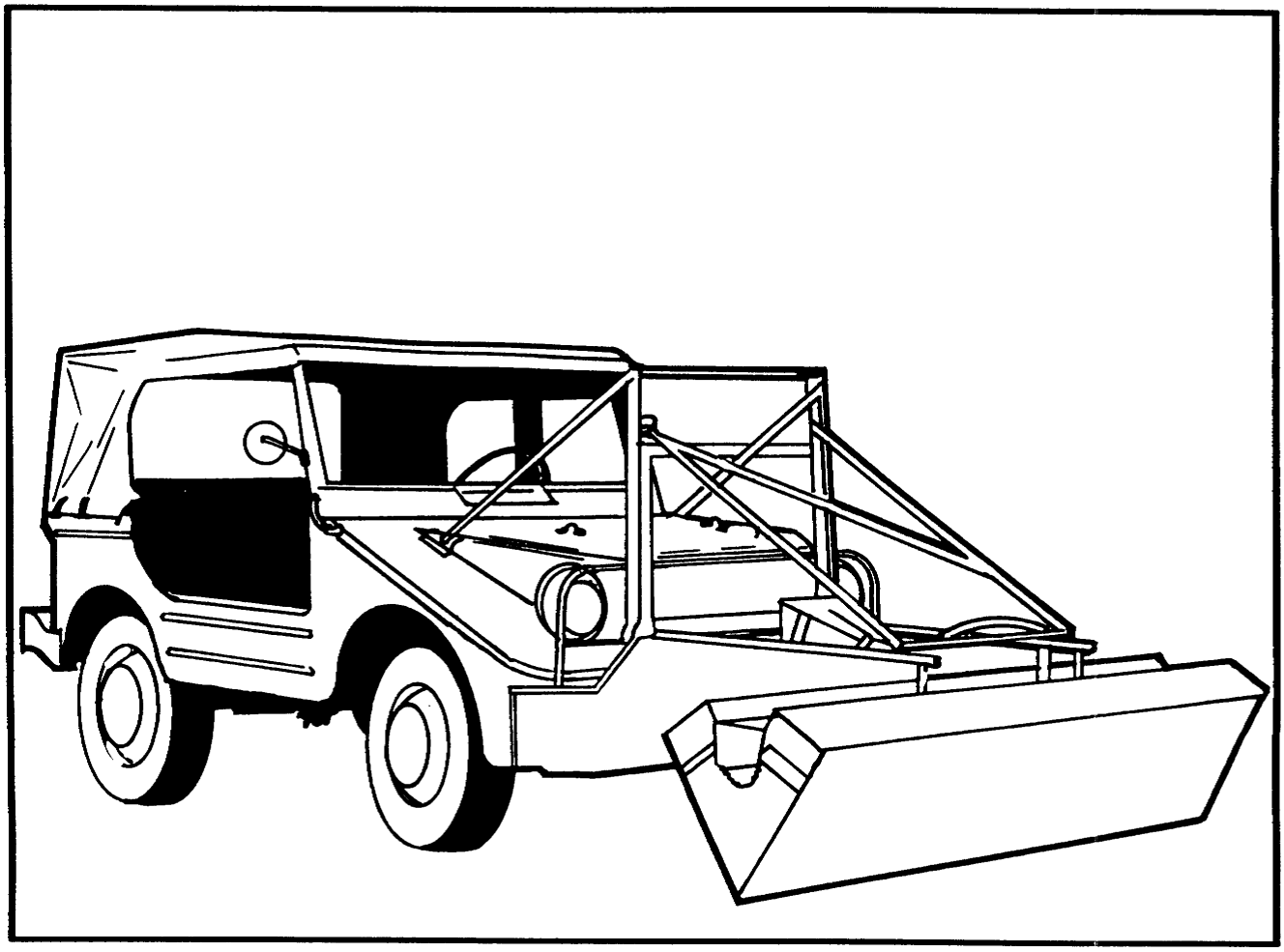


Figure 2-14. Mine Detector MSG-1.

Characteristics:

It is attached to the front of a LKW or Rover.
Equipment is mounted on an open frame with a V-type device approximately 1.00m front of vehicle.

NOTE: This is a new development by a German firm.

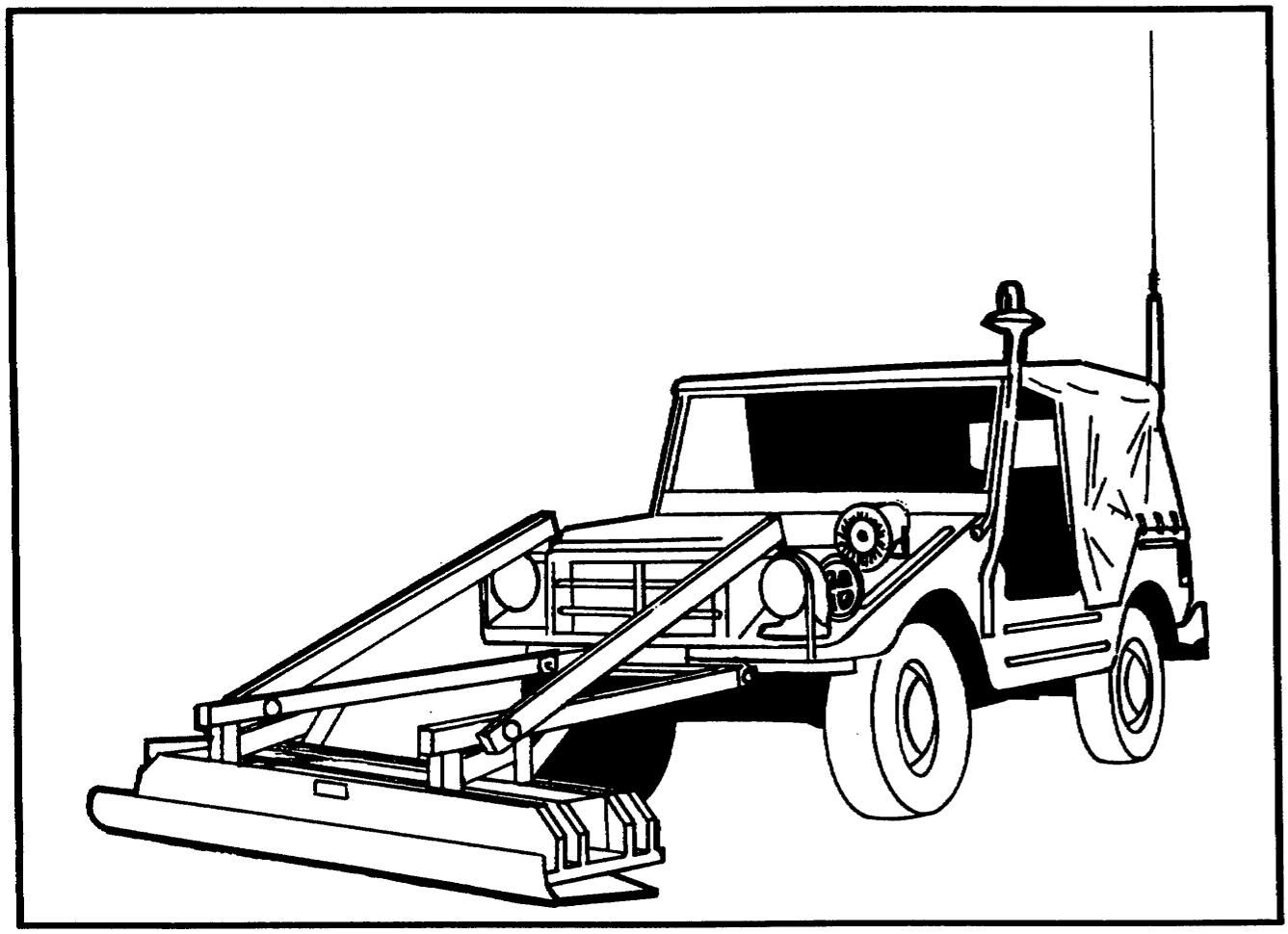


Figure 2-15. Metal Detector Model ML-1750.

Characteristics:

Equipment is mounted on an open frame about 1.00 m in front of vehicle.
Detector is a bar-type device.
It is attached to the front of a LKW or Rover.

User countries: In service with various countries.

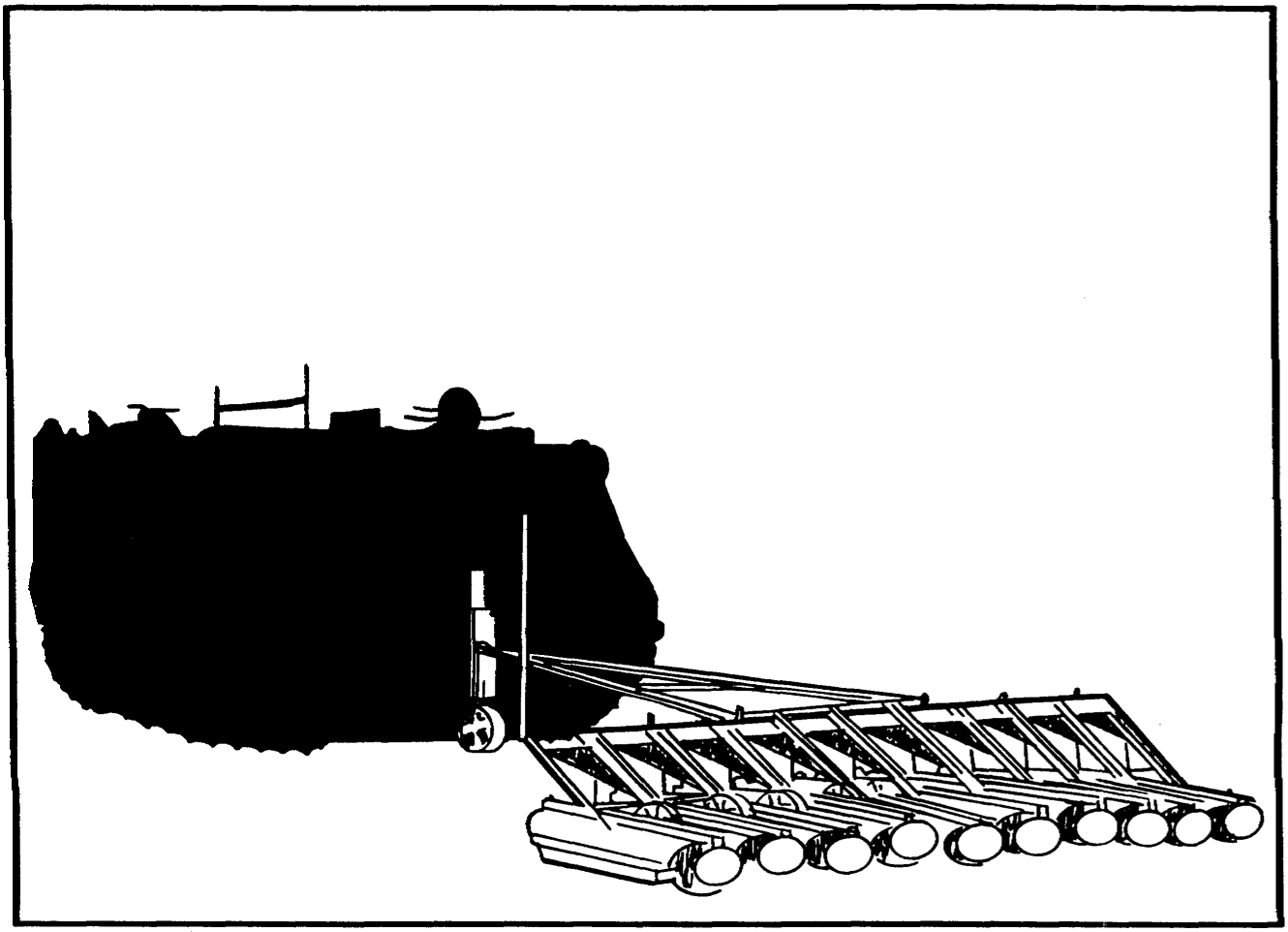


Figure 2-16. Road Mine Detector System (VMRDS) AN/VRS-5.

Characteristics:

3.60m long, 2.00m wide.
It is attached to a APC M1 13 or M151A2 light vehicle.
It consists of a stirable search head (composed of any array of antenna modules).
Equipment is mounted on an A-shaped frame with boom assembly in front of a vehicle.

User country: It is undergoing final phase of development testing in US.

PART E: IDENTIFICATION CHARACTERISTICS OF MINE CLEARING EQUIPMENT

1. One type of mine clearing equipment is the tank-mounted roller or plow system. It attaches to the front of a main battle tank. The CIS uses roller types, such as the PT-54 and PT-55 (Figure 2-21). The T-54B (Figure 2-19) uses a sweep chain in front of the four rollers to tilt rod fuses. The plow type, such as the KMT-4, is also used by the CIS. The KMT-4 has a cutting device with teeth mounted at an angle in front of each track. The KMT-5 (Figure 2-20) combines both rollers and plow.

2. The US is working on a plow type to be attached to the main battle tank (MBT) M60. It has reached the prototype stage. The United Kingdom (UK) has developed the Giant viper. It consists of a two-wheeled trailer with a box mounted on it. In the box is 229 meter long hose filled with plastic explosive. The Giant Viper is usually towed by a Centurion AVRE, FV-432, or the new combat engineer tractor (CET). It requires the support of a 3-ton truck.

3. The following dichotomous-type elimination key depicts selected world mine clearing equipment; use it as a guide only.

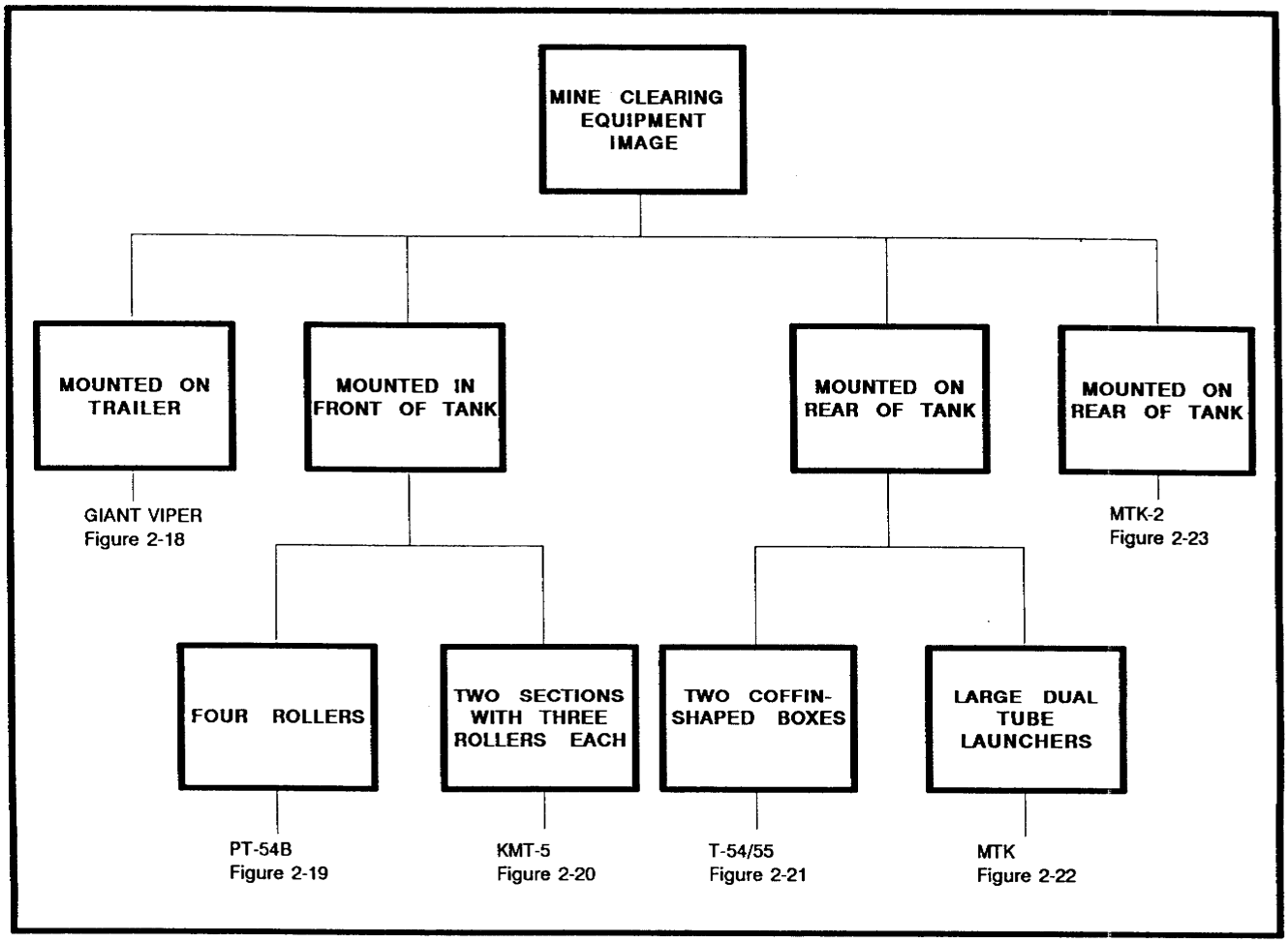

MINE CLEARING EQUIPMENT IMAGE
MOUNTED ON TRAILER
MOUNTED IN FRONT OF TANK
MOUNTED ON REAR OF TANK
MOUNTED ON REAR OF TANK
GIANT VIPER
Figure 2-18
MTK-2
Figure 2-23
FOUR ROLLERS
TWO SECTIONS WITH THREE ROLLERS EACH
TWO COFFIN-SHAPED BOXES
LARGE DUAL TUBE LAUNCHERS
PT-54B
Figure 2-19
KMT-5
Figure 2-20
T-54/55
Figure 2-21
MTK
Figure 2-22

Figure 2-17.

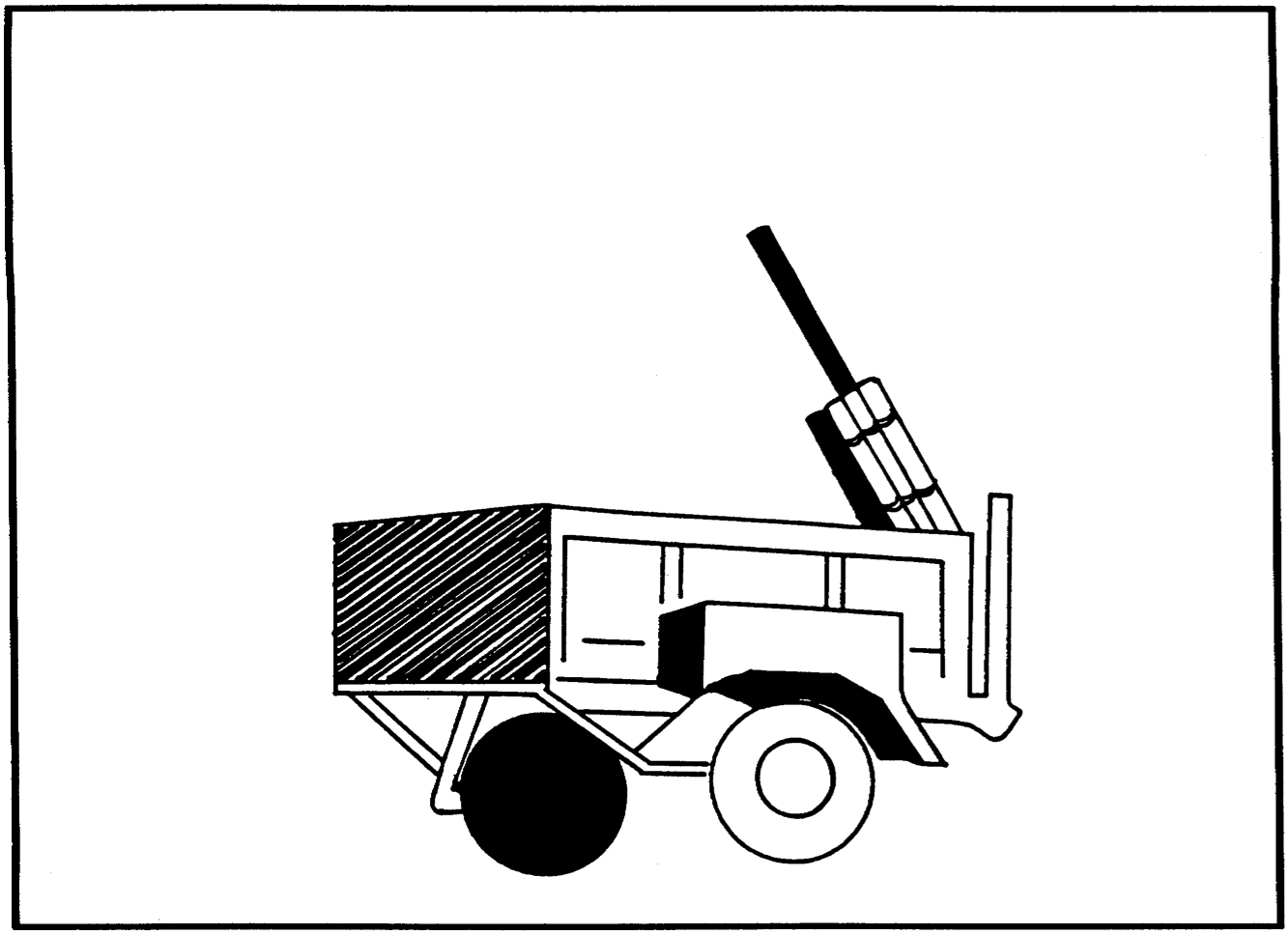


Figure 2-18. Antitank Mine Clearing Equipment Giant Viper.

Characteristics:

3.15m long, 1.74m wide.
Equipment is mounted on two-wheeled trailer.
Trailer is towed by a variety of tracked vehicles, such as Centurion AVRE, FV-432, or new combat engineer tractor (CET).
Cluster of eight rocket motors and firing tube are mounted at rear of trailer.
It has a gatling gun appearance.

User country: UK.

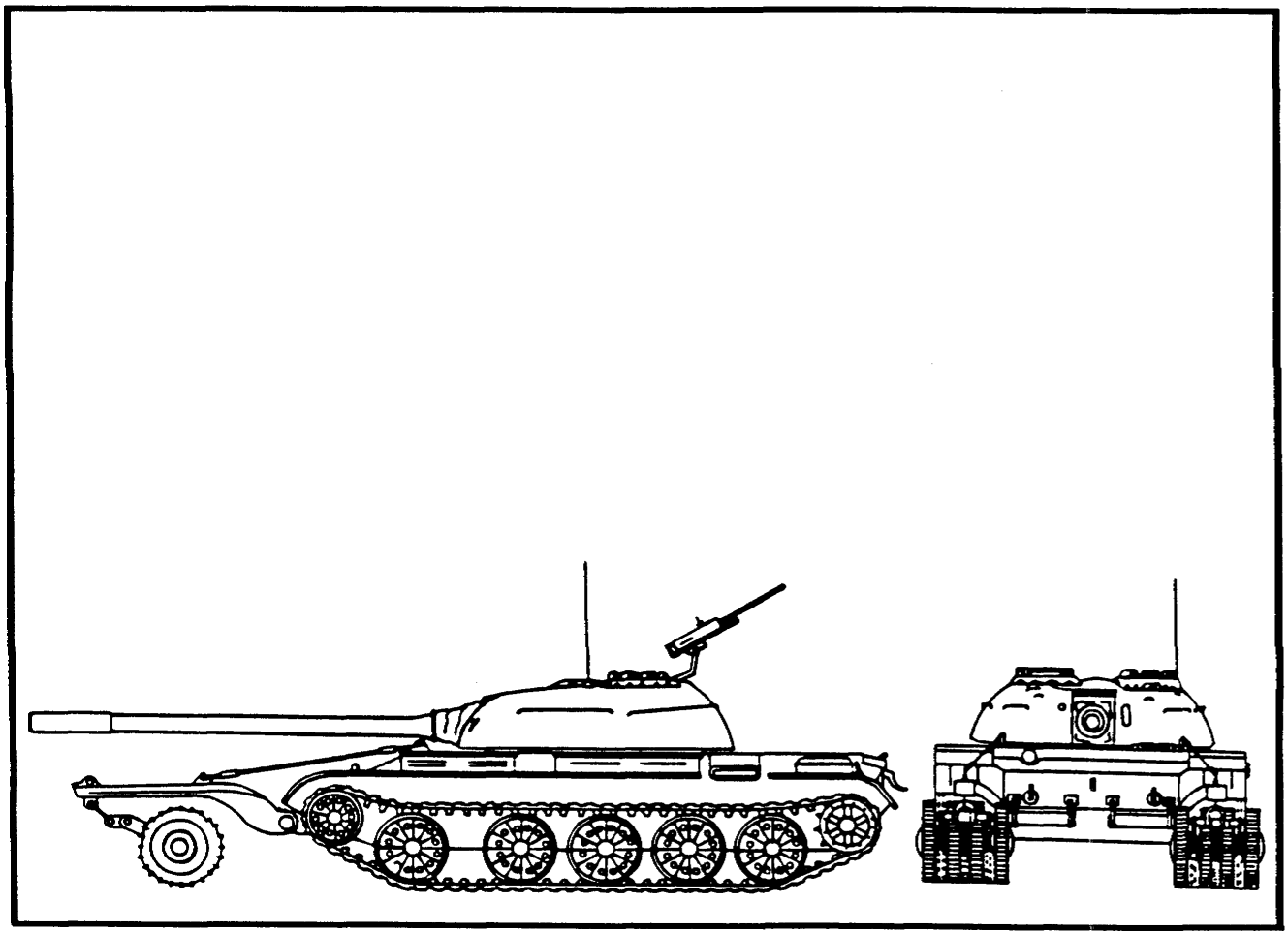


Figure 2-19. Mine Clearing Roller Type PT-54B

Characteristics:

Measurements are not available.
Equipment consists of four rollers that are mounted in front of each tank tract.
Sweep chain in used to tilt rod fuzes.

User countries: CIS, Eastern European, and some Middle Eastern countries.

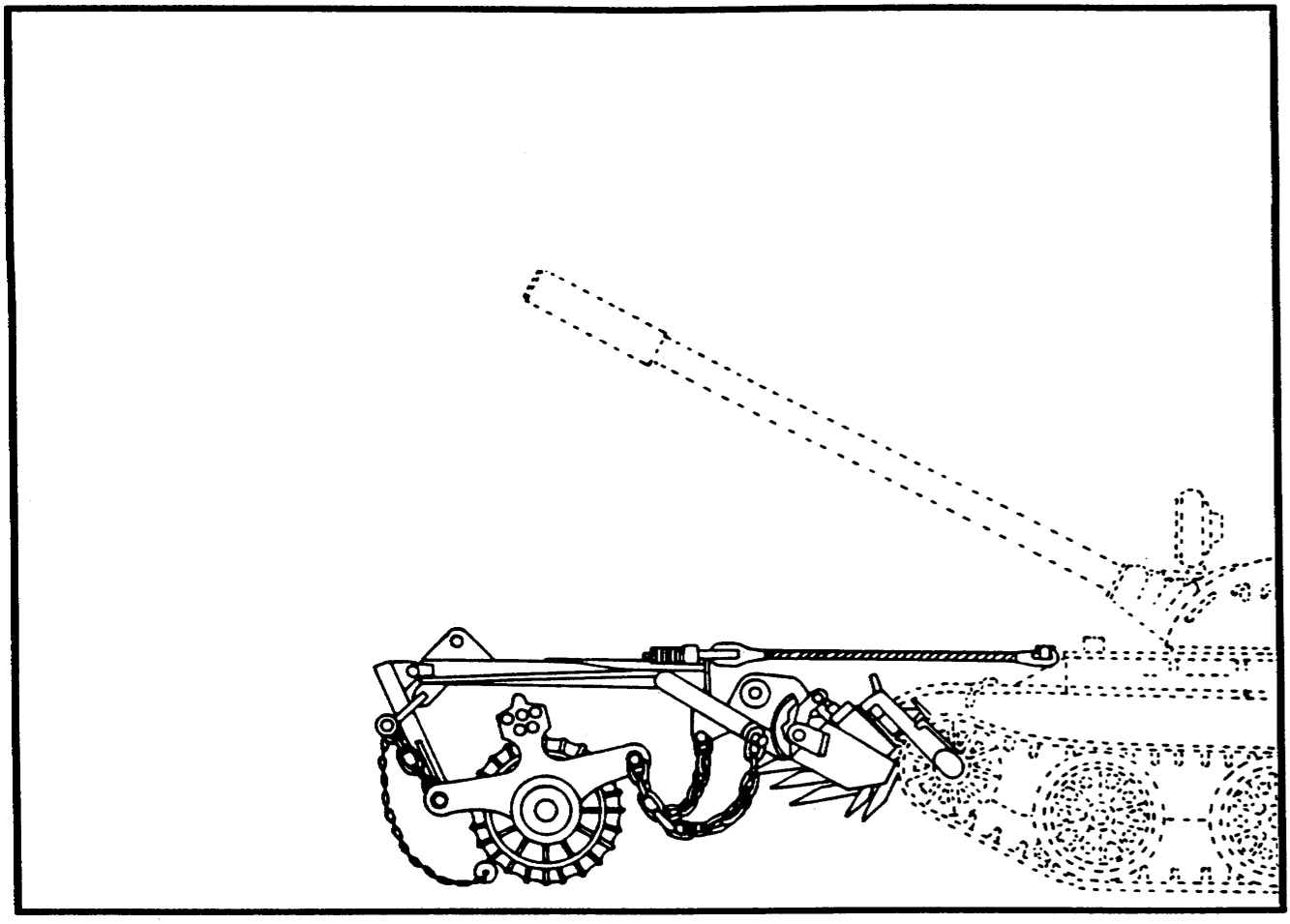


Figure 2-20. Meandering Plow KMT-4/6.

Characteristics:

3.00m long, 4.00m wide.
Equipment is mounted in front of tank.
There are two sections with 3 rollers each.
Plow is combined with rollers.
KM-61 crane is mounted on KrAZ-214 truck used to position and remove mine clearing rollers and plows.

User countries: CIS, Eastern European and Middle Eastern countries.

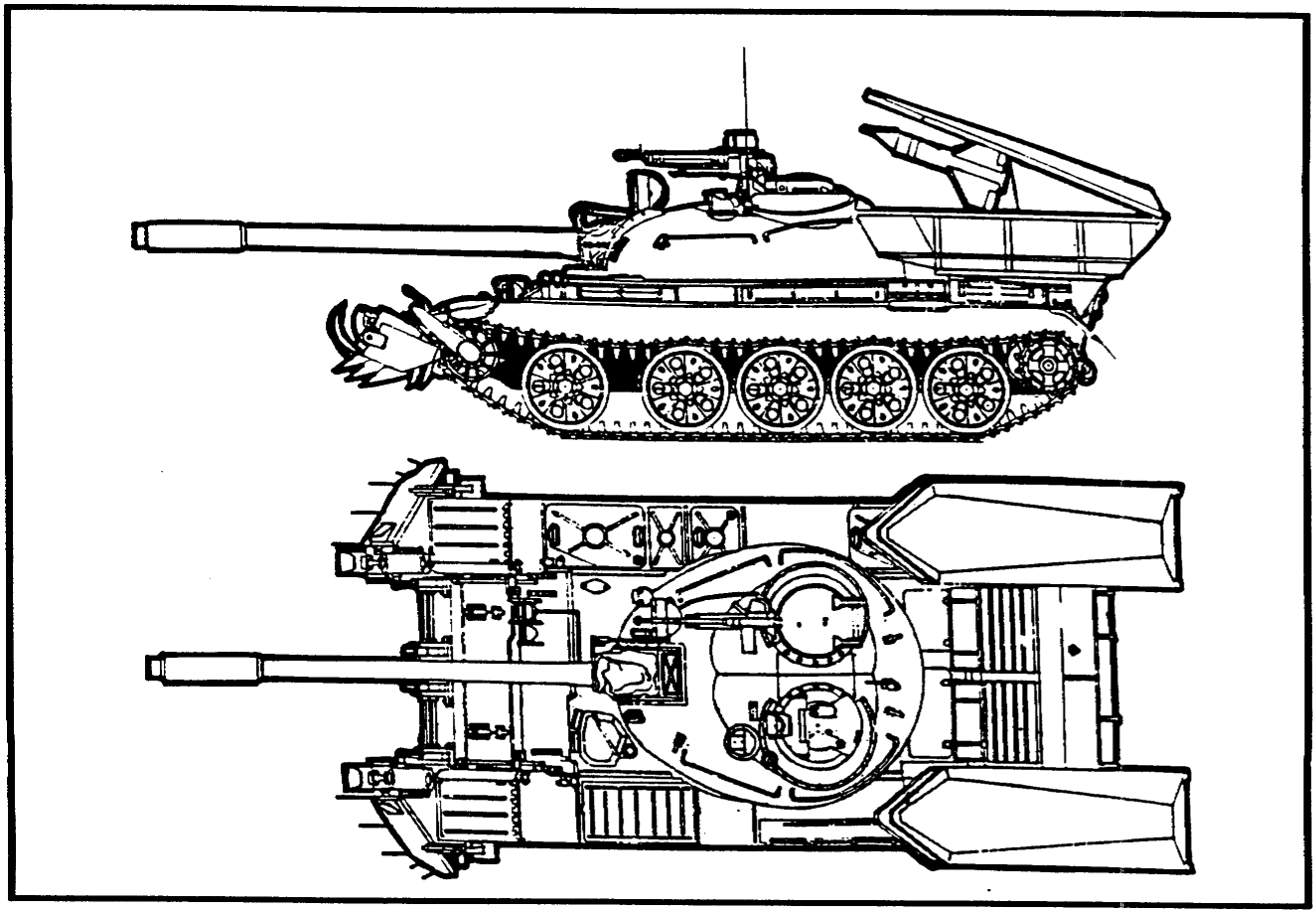


Figure 2-21. Rocket Propelled Mine Clearing Equipment T-54/55.

Characteristics:

9.00m long, 3.27m wide.
Equipment is mounted on rear deck of T-54/55 tank.
Two coffin-shaped boxes are mounted on the rear deck.
Boxes are fitted with rockets and explosive-filled hose line for firing over minefield and clearing mines by sympathetic detonation.

NOTE: Poland also mounts this equipment n the PTS amphibious vehicle.

User countries: CIS and Eastern European countries.

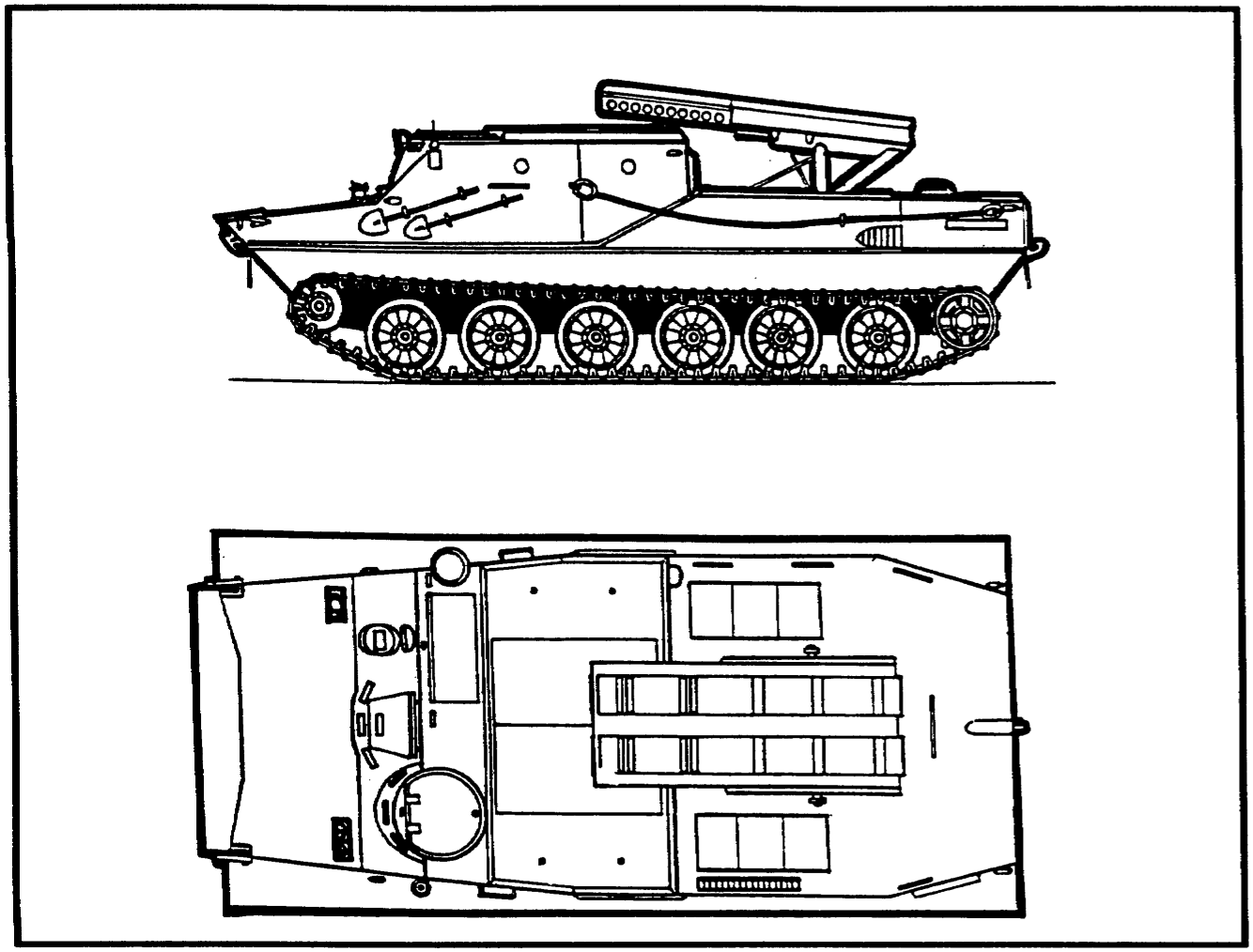


Figure 2-22. Mine Clearing Tank MTK.

Characteristics:

7.07m long, 3.14m wide.
Equipment is mounted on rear deck of modified BTR-50PK APC.
Large diameter, flexible tube launchers are at rear.
Fires line charge is used for mine clearing.
It was formerly known as the UR-67.

User country: CIS.

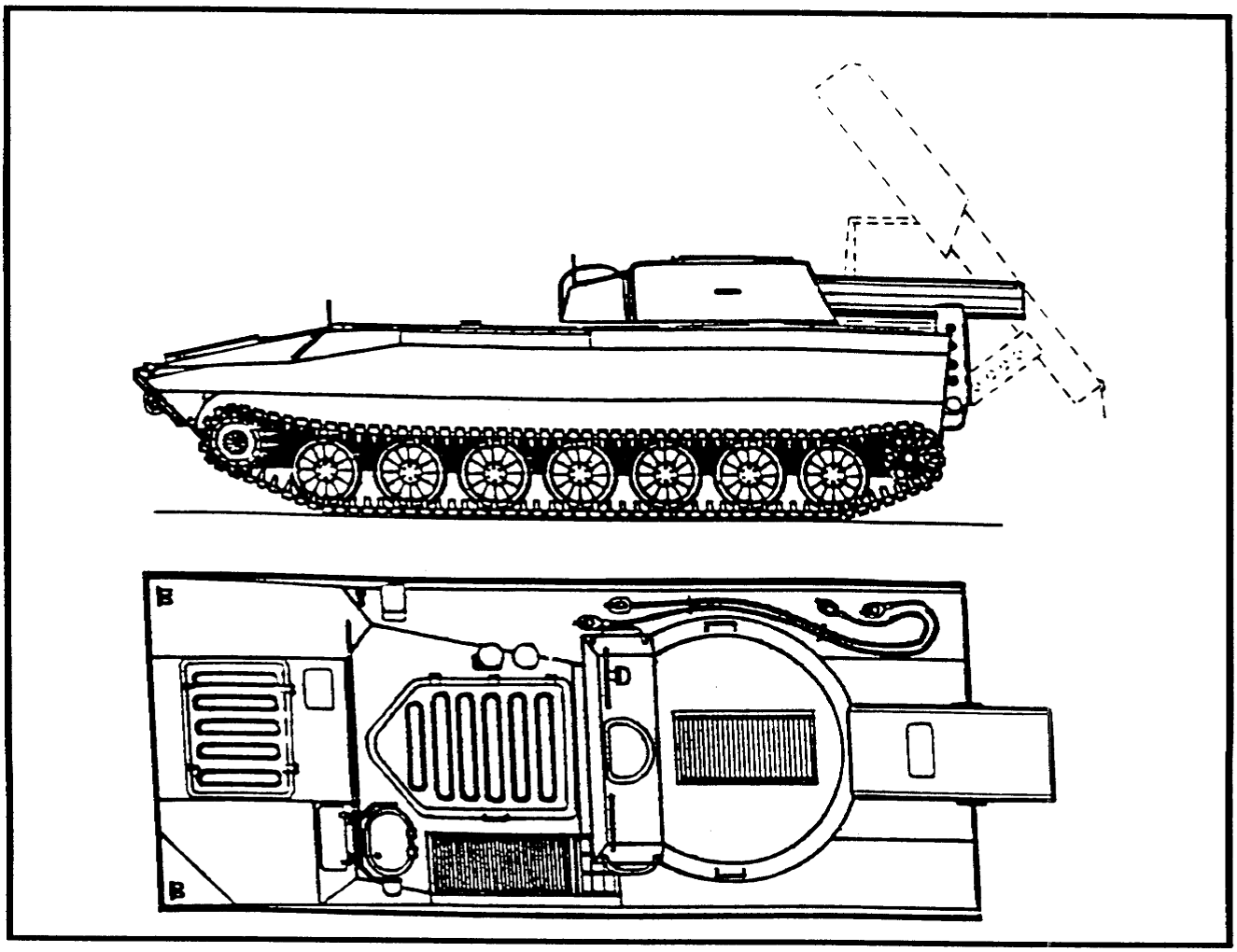


Figure 2-23. Mine Clearing Tank MTK-2.

Characteristics:

7.85m long, 2.85m wide.
Equipment is mounted on rear of a modified 2S1 self-propelled howitzer chassis.
Turret-like superstructure contains three rockets in launch ramp.
It fires mine clearing hose from launch ramp.
It was formerly known at the M1 979/UR67.

User countries: CIS, Eastern European, North African and Middle Eastern countries.

LESSON 2

PRACTICE EXERCISE

The following items will test your grasp of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

1. Which chassis is used by the GMZ?

   A. 2S1.

   B. SA-4.

   C. M60A1.

   D. T-54/55.

2. What type equipment is shown in Figure 2-24?

   A. Metal detector ML-1750.

   B. Minelayer GMZ.

   C. Antitank mine clearing equipment giant viper.

   D. Mine clearing tank MTK-2.

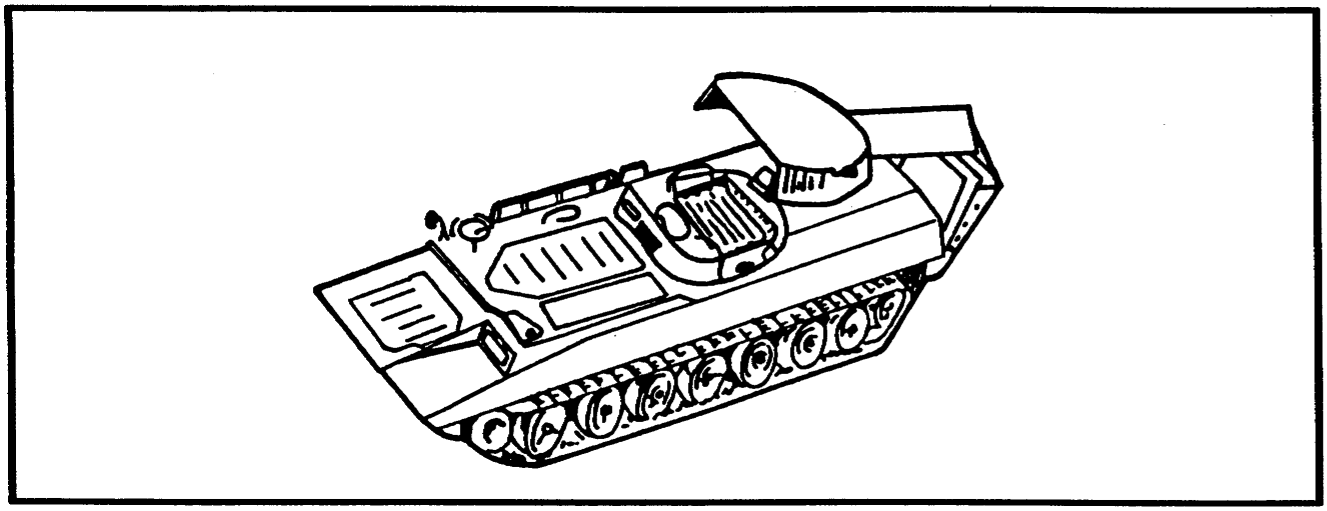


Figure 2-24

3. Which mine detector equipment is mounted in front of a LKW or Rover?

   A. AN/VRS-5.

   B. ML-1750.

   C. DIM.

   D. M57.

4. Which mine launching system uses six magazine launch boxes?

   A. GMZ.

   B. Mantenin.

   C. Skorpion.

   D. VS-MTLU-1.

5. Which mine brier is employed by France?

   A. DIM.

   B. Skorpion.

   C. Giant Viper.

   D. Mantenin.

LESSON 2

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

Item	Answer Key and Feedback
1.	B. The GMZ uses a SA-4 GANEF transporter chassis (page 2-3, para 3).
2.	D. This is a mine clearing tank MTK-2, equipment is mounted on rear of modified 2S1; it has a turret-like superstructure which is tilted in firing position (page 2-28, fig 2-23).
3.	B. The ML-1750 is mounted in front of a LKW or Rover truck (page 2-19, fig 2-15).
4.	C. The skorpion mine launching system uses six magazine-type launch boxes (page 2-7, fig 2-4).
5.	D. The Manenin mine brier is employed by France (page 2-8, para 2).

LESSON 3

IDENTIFY ENGINEER CONSTRUCTION EQUIPMENT ON AERIAL IMAGERY
CRITICAL TASKS: 301-338-1808
301-338-3701

OVERVIEW

TASK DESCRIPTION:

In this lesson you will learn to identify engineer construction equipment to include tractors, earth movers, ditching machines, cranes, and dump trucks on aerial imagery using imagery analysis techniques and procedures.

LEARNING OBJECTIVE:

ACTIONS: Use the elimination process to identify engineer construction equipment on aerial imagery.

CONDITION: You will be given extracts from FM 1-402; STP 34-96D1-SM; TM 30-326, Vol I; 10th TRS NATO Equipment Recognition Keys; Jane's Military Vehicles and Ground Support Equipment, and Soldat und Technik's Erkennungsblaetter.

STANDARD: You will identify engineer construction equipment IAW FM 1-402; STP 34-96D1-SM; STP 34-96D24-SM-TG; TM 30-326, Vol I; 10th TRS NATO Equipment Recognition Keys; JFKWC Soviet and Warsaw Pact Equipment Keys; Jane's Military Vehicles and Ground Support Equipment; and Soldat und Technik's Erkennungsblaetter.

REFERENCES: FM 1-402
STP 34-96D1-SM
STP 34-96D24-SM-TG
TM 30-326, Vol I
10th RTS NATO Equipment Recognition Keys
Jane's Military Vehicles and Ground Support Equipment
Soldat und Technik's Erkennungsblaetter.

INTRODUCTION

The use of construction equipment has a critical impact on the functional areas in order to accomplish primary battlefield missions, to include filling craters and ditches; remove roadblocks, trees, rubble, and other battlefield obstructions; prepare and maintain combat routes and airstrips; construct antiarmor obstacles; demolish ford and bridge bypasses; dig tank ditches; prepare strongpoints; haul obstacle materials; dig armor positions; construct defensive positions for command and control operations; and clear fields of fire.

PART A: CONSTRUCTION EQUIPMENT TYPES

1. A certain percentage of CIS T-34/85, T-54, and T-55 medium tanks have been equipped with the BTU dozer blades for use within tank units requiring specialized engineer support. The tank dozers accompany the armored vehicles and are used to neutralize obstacles while under fire. The BTU dozer blades can be mounted in 90 minutes and dismounted in 60 minutes. They are found in tank battalions in the MRDs and TDs.

2. NATO armies tend to use multipurpose and civilian construction equipment. The new US family of military engineer construction equipment (FAMECE) (Figure 3-4) is an excellent example of a multipurpose tractor.

3. The CIS leans toward specialized equipment for specific tasks. The CIS BTU tank dozer blades is an example (Figure 3-1). Construction equipment is usually found in the technical company and the road/bridge construction company of an engineer battalion of an MRD or TD. Typical construction equipment are the E-305V (Figure 3-27) truck-mounted crane/shovel, the bulldozer BAT-M (Figure 3-11), and the ditching machine BTM (Figure 3-12).

4. Selected construction equipment is shown in the following parts. Keep in mind there is not enough space to include the multitude of such equipment. For additional information, consult the manuals and technical books referenced in the overview (page 3-1).

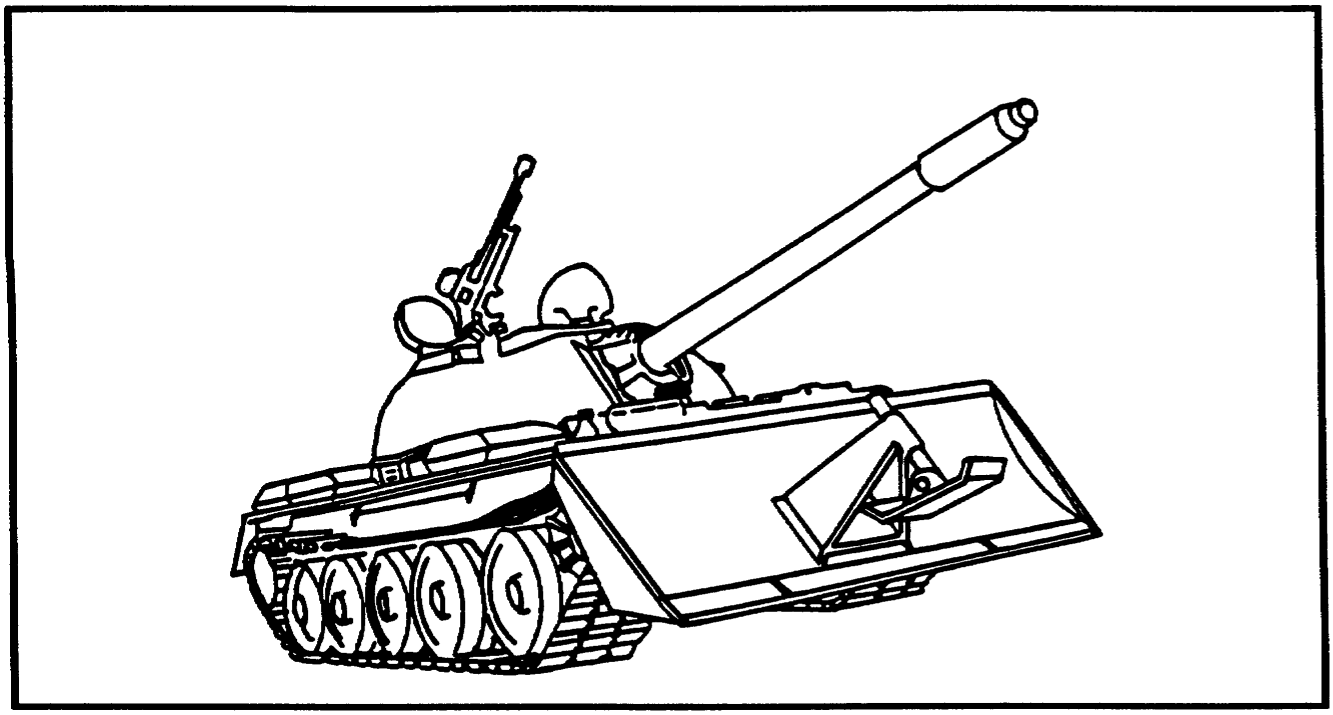


Figure 3-1. BTU Dozer Blade.

PART B: IDENTIFICATION CHARACTERISTICS OF TRACTORS

1. Tractors are important pieces of construction equipment. The exact designator will often be unknown. In that situation, the IA must know how to describe the piece of equipment. Many times civilian equipment will be used.

2. Types of Tractors. Figures 3-2 illustrates the different types of tractors.

3. Attachments. A detailed report may require what type of attachments (if any) are present on the equipment. Figure 3-3 shows some examples of different types of attachments.

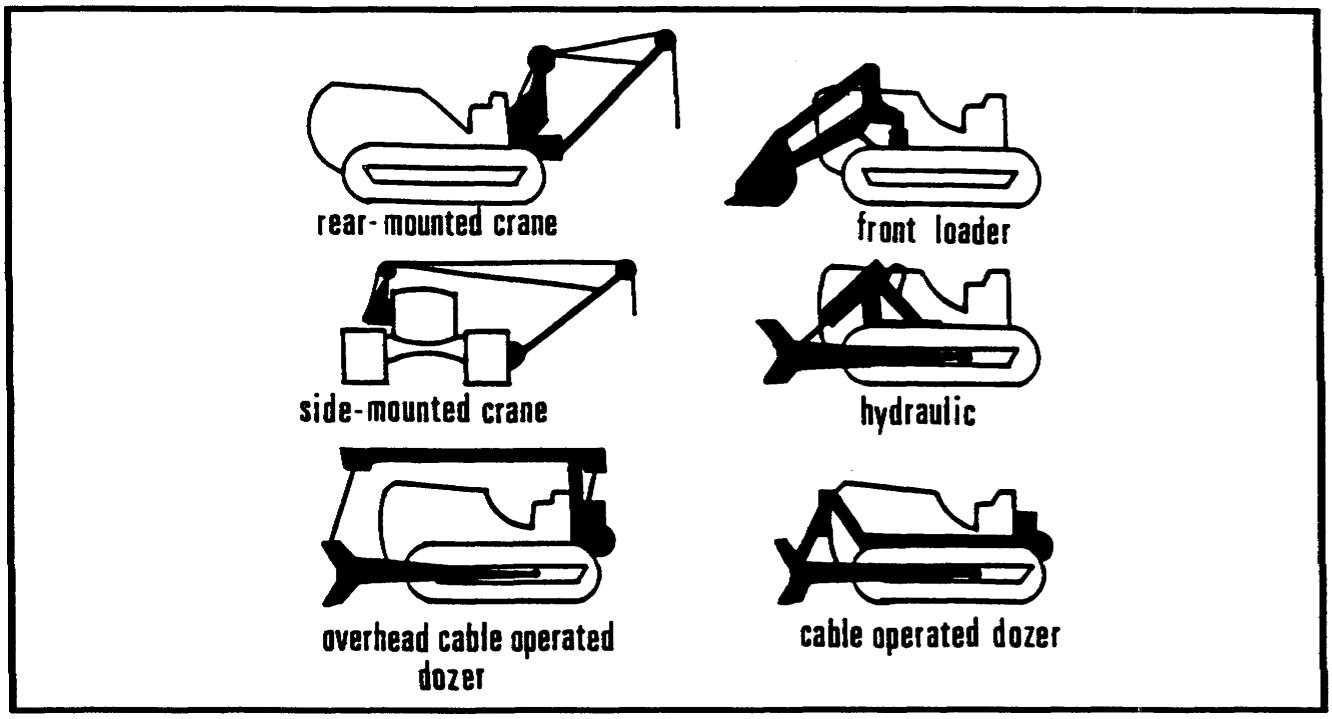


Figure 3-2. Tractors.

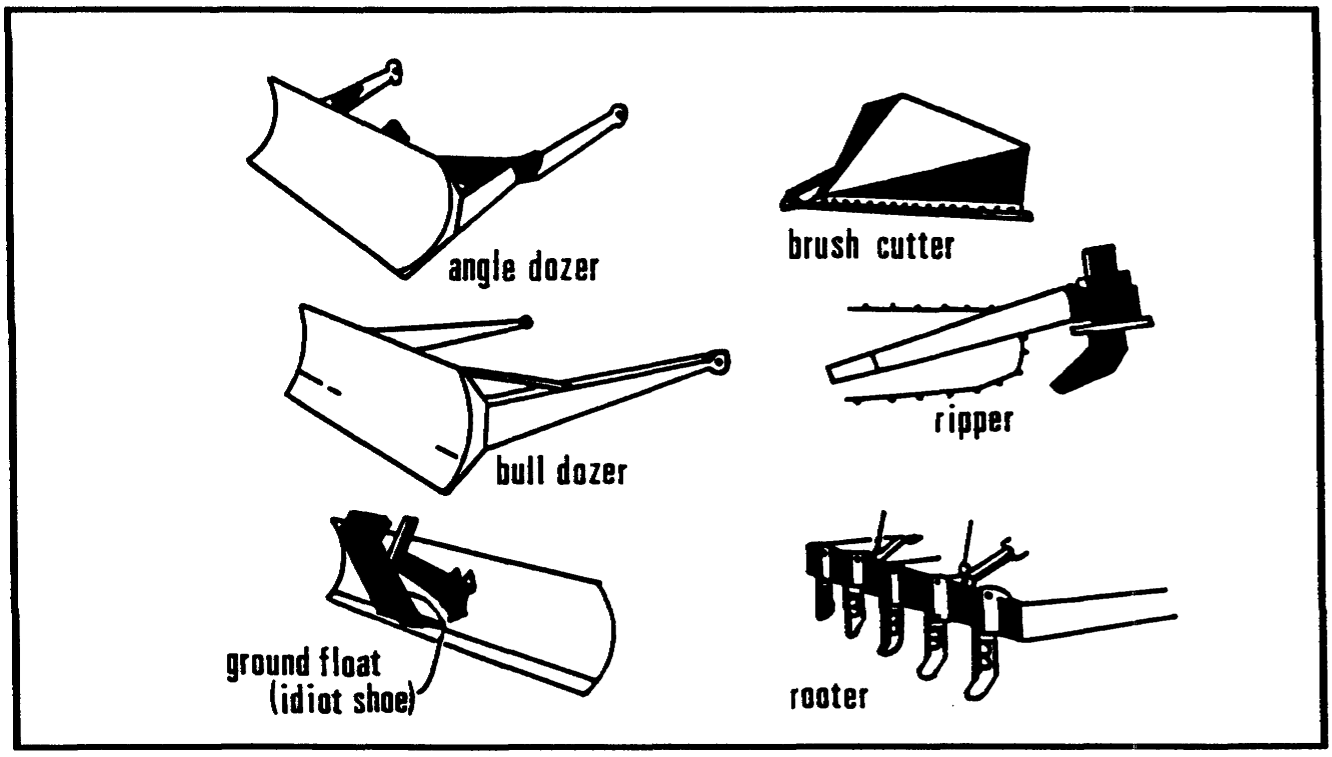


Figure 3-3. Tractor Attachments.

4. Loading.

a. Backtrack loading. The dozer pushes the scraper until loaded, backs through the area just cut, positions itself behind the second loader, and repeats the loading cycle.

b. Shuttle loading. After the dozer push-loads the first scraper, another scraper is positioned so the dozer can reverse direction and load the second scraper, which is moving in the opposite direction.

c. Chain loading. In long cuts, the dozer push-loads the first scraper, then moves behind and pushes the second scraper which is moving in the same direction and adjacent to the first.

5. The FAMECE is a family of air transportable/air droppable construction vehicles of the US (Figure 3-4). Each consists of a power module and a work module. It is primarily used by airborne/airmobile units. The FAMECE should replace 20 current makes and models of construction equipment.

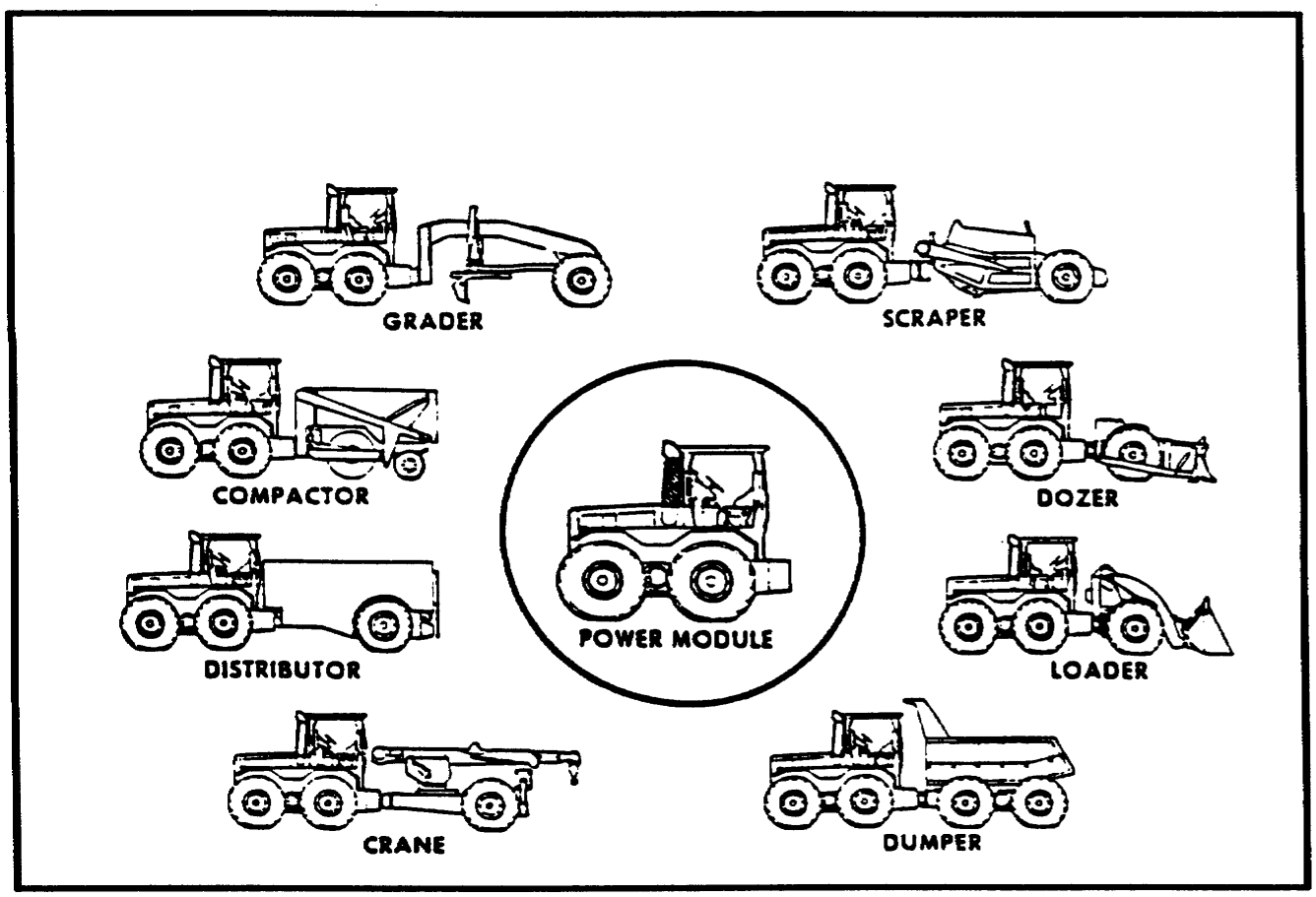


Figure 3-4. FAMECE.

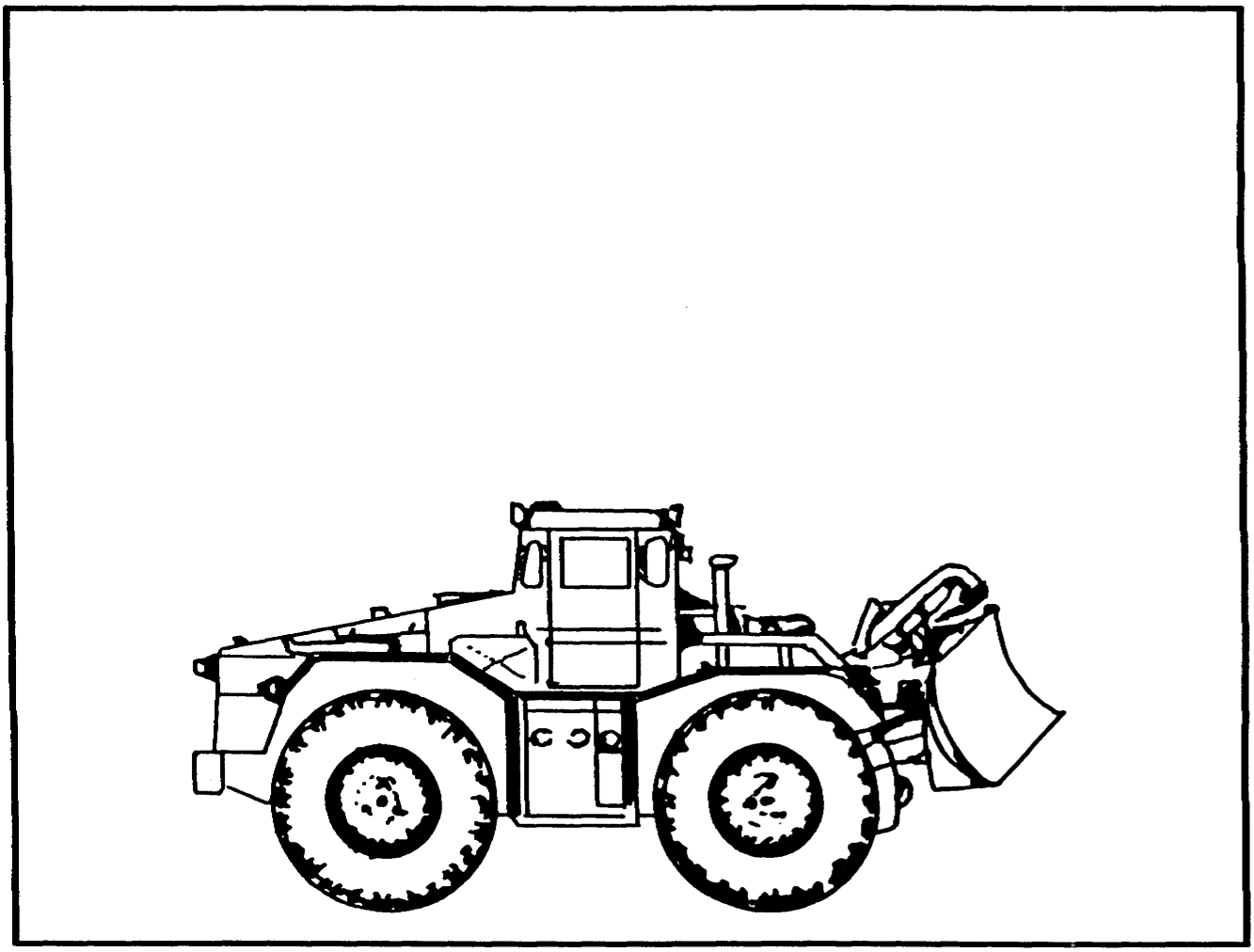


Figure 3-5. Tractor MAZ-538 PKT.

Characteristics:

Measurements are not available
It is a wheeled tractor.
It is a variant of the MAZ-538 tractor.
It has two axles with cab centered between.
It is a front loader.

User country: CIS.

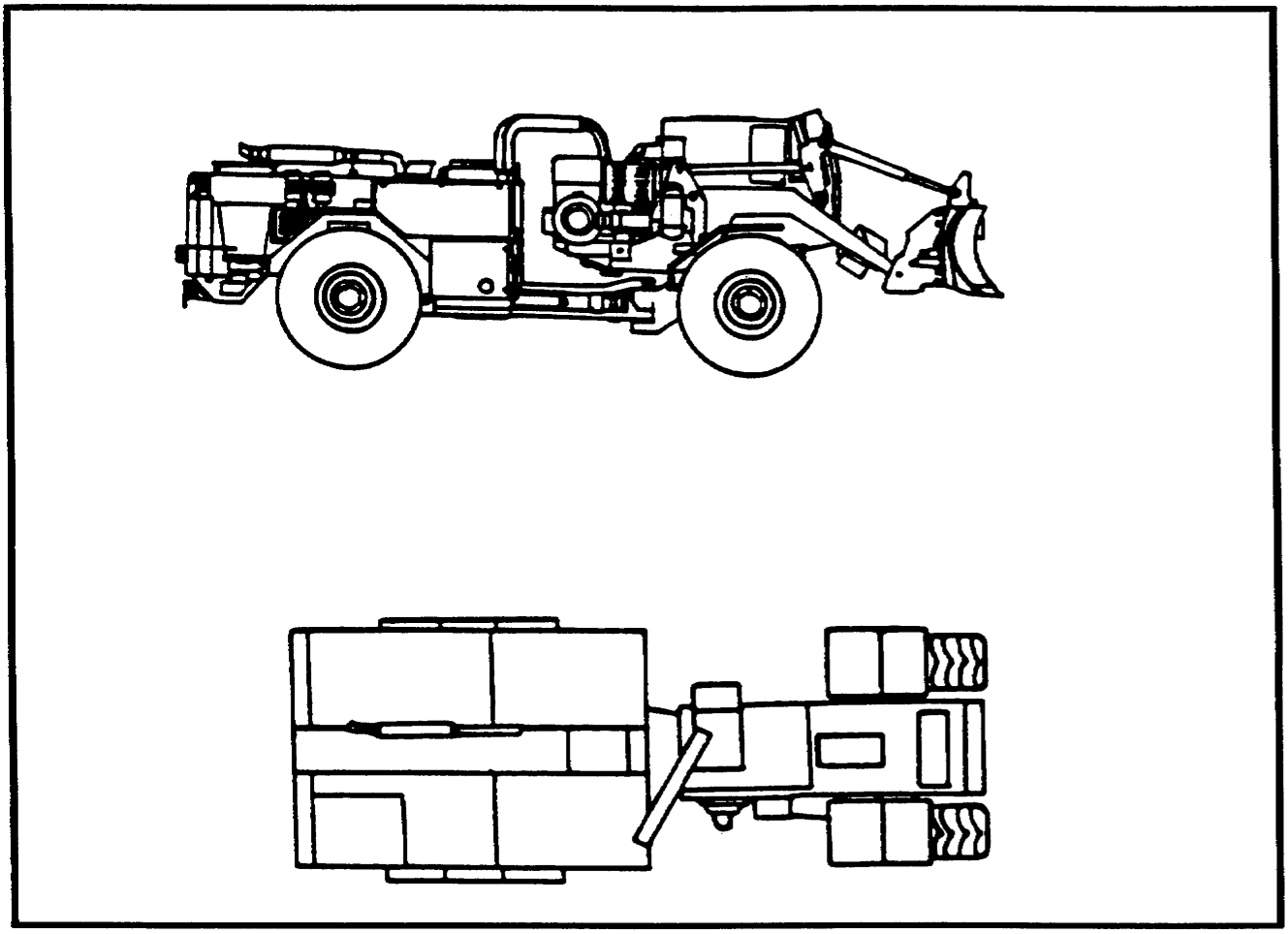


Figure 3-6. Enginer Tractor KOK.

Characteristics:

10.53m long, 3.15m wide.
It is a wheeled tractor.
It has an articulated chassis with two axles.
Cab is at front with a winch directly behind.
It has a multipurpose scoop at front.
It is a front loader.
Prominent hydraulic arm in center will show even when covered with dirt.

Variants: DOK-L has a universal shovel.
DOK-R has an arrow-shaped blade which can be adjusted to form a straight blade.

User country: Czech Republic and Slovenia.

PART C: IDENTIFICATION OF EARTH MOVERS

1. Most pieces of engineer equipment are capable of earth moving. There are many different types of earth movers to include bulldozers, backhoes, trenching machines, and so on. Bulldozers are primarily used for earth moving operations. The CIS have special military trenching machines such as the MDK-2, BAT-M, and BTM (Figures 3-10/3-11/3-12). Civilian equipment is often purchased and used for earth moving. In that situation, an IA cannot give the nomenclature of the piece of equipment. It must be reported by type, such as bulldozer (civilian), similar to a BAT-M, and so on.

2. In Eastern European Armies, earth moving equipment is organic to the engineer battalion of the MRD and TD, such as the D-144 grader. A few have also been observed in the MRRs and TRs.

3. The following dichotomous-type elimination key is of selected earthmoving equipment. Use this as a guide only.

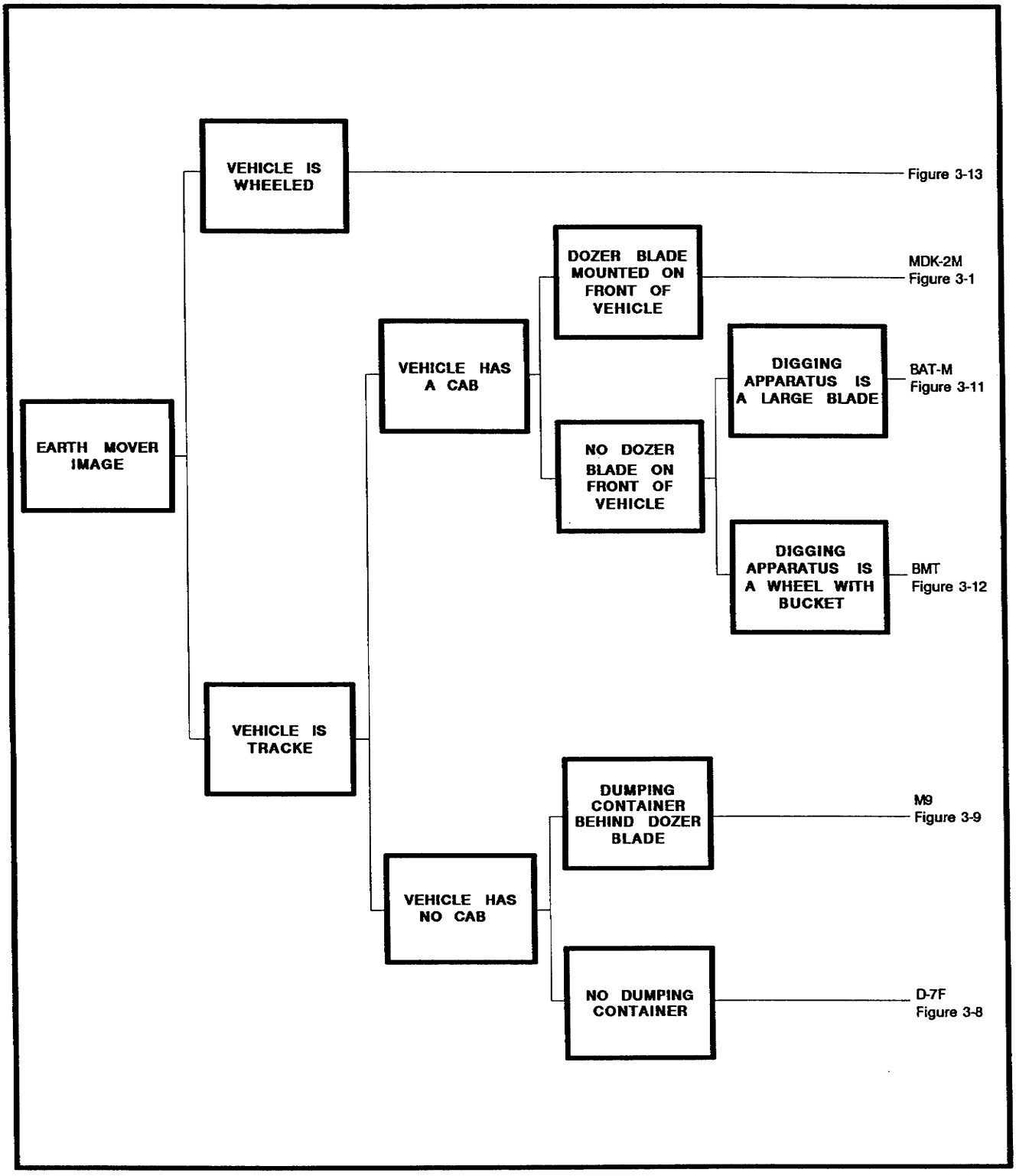

EARTH MOVER IMAGE
VEHICLE IS WHEELED
Figure 3-13
VEHICLE IS TRACKE
VEHICLE HAS A CAB
DOZER BLADE MOUNTED ON FRONT OF VEHICLE
MDK-2M
Figure 3-1
NO DOZER BLADE ON FRONT OF VEHICLE
DIGGING APPARATUS IS A LARGE BLADE
BAT-M
Figure 3-11
DIGGING APPARATUS IS A WHEEL WITH BUCKET
BMT
Figure 3-12
VEHICLE HAS NO CAB
DUMPING CONTAINER BEHIND DOZER BLADE
M9
Figure 3-9
NO DUMPING CONTAINER
D-7F
Figure 3-8

Figure 3-7.

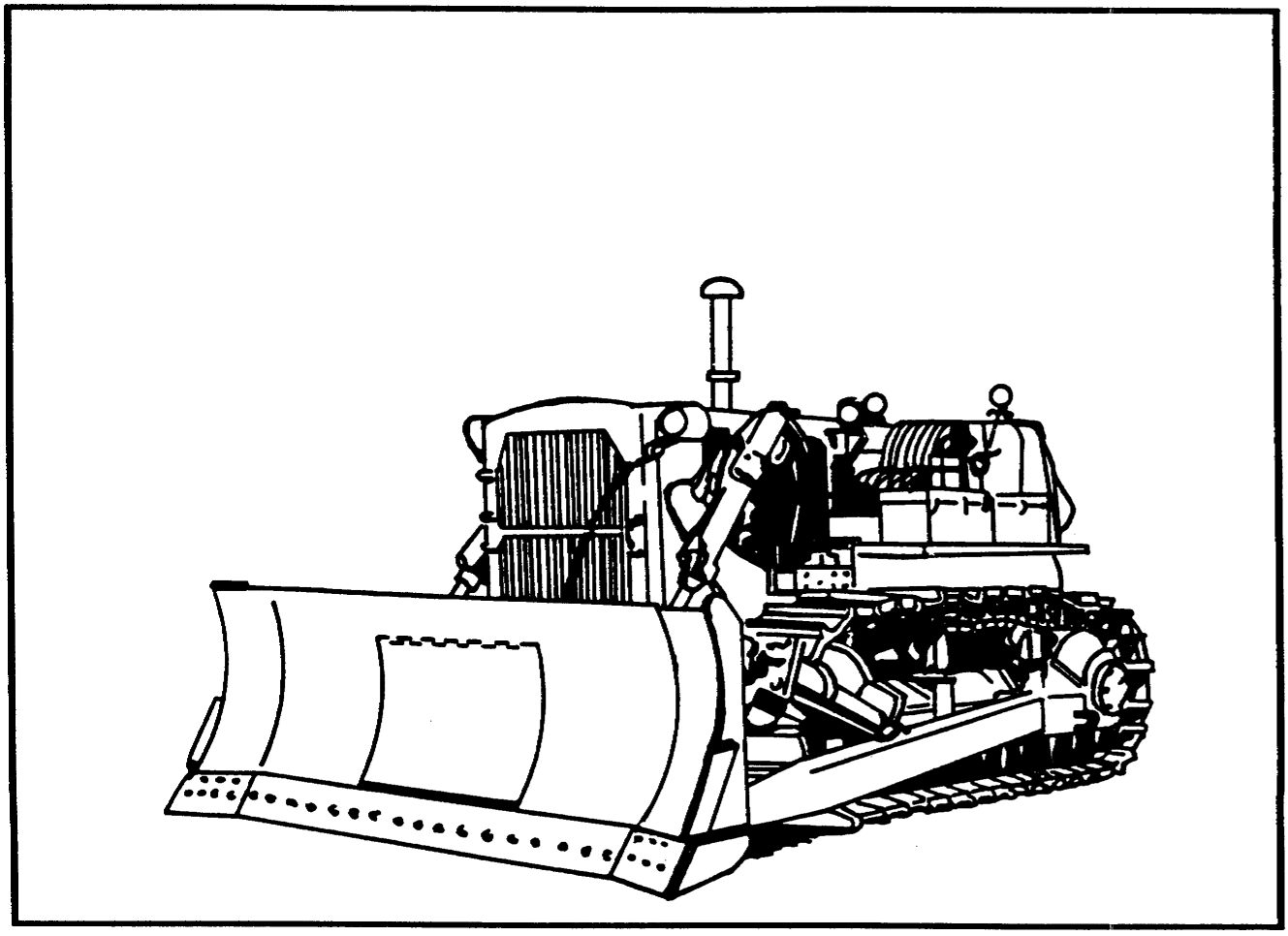


Figure 3-8. Heavy Bulldozer Caterpillar Mitsubishi D-7F.

Characteristics:

5.74m long, 3.77m wide.
Vehicle is tracked and has no cab.
Dozer blade is at front of vehicle.
No dumping container is behind dozer blade.
Operator sits to rear of vehicle.
It has earthmoving capability.

User country: Japan.

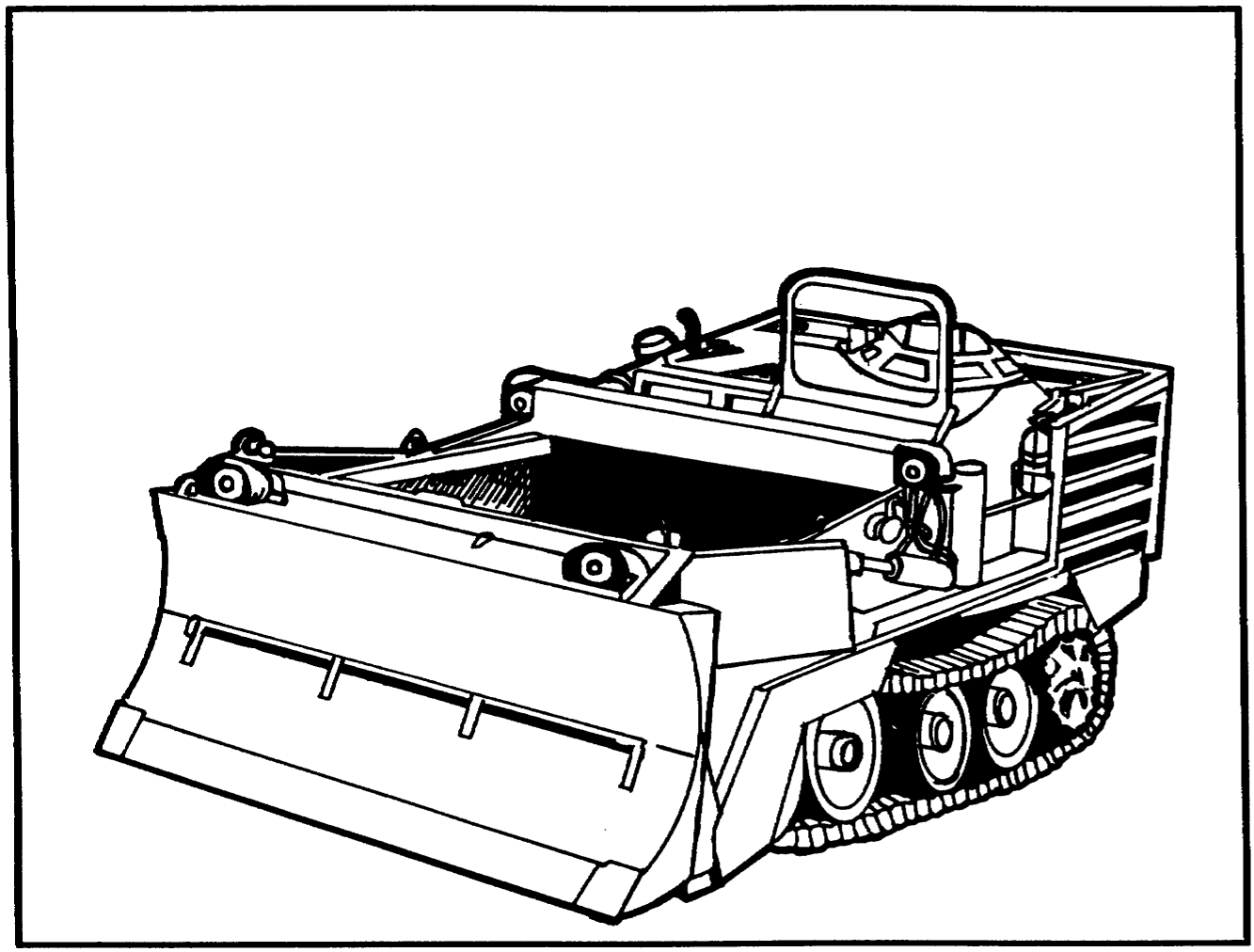


Figure 3-9. Armored Combat Earth Mover M9.

Characteristics:

6.25m long, 3.20m wide.
Vehicle is tracked and has no cab.
Dozer blade is at front.
Dumping container is behind dozer blade.
Operator sits to the rear of vehicle.
Angle dozer blade is in front.

User countries: US and other major armies.

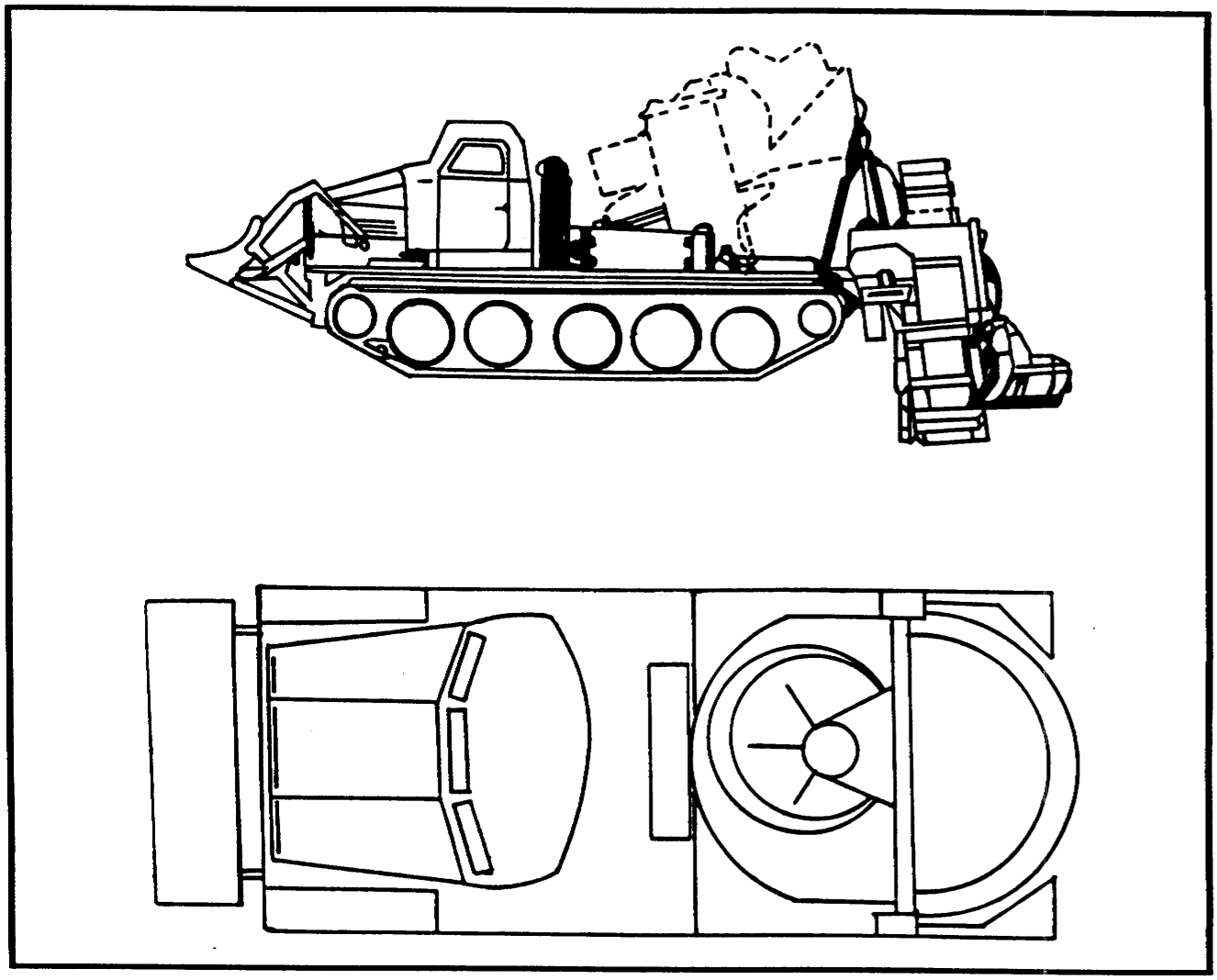


Figure 3-10. Ditching Machine MDK-2.

Characteristics:

8.00m long, 4.00m wide (dimensions for travel mode).
Equipment is mounted on an AT-T heavy-tracked artillery tractor chassis with truck-type cab.
Vehicle has a cab.
Dozer blade is at front of cab.
Rotary-cutting head is mounted at rear, rotates in a nearly vertical plane.
It is located in the technical company of the engineer battalion in a MRD or TD; it may also be found in a technical platoon of the engineer company in MRR or TR.

NOTE: Vertical view is in travel mode. Side view is in operational mode. The MDK-2M creates a ditch wider than the vehicle. Can emplace 12 x tanks in 1 hour.

User countries: CIS, Eastern European, Middle Eastern and North African countries.

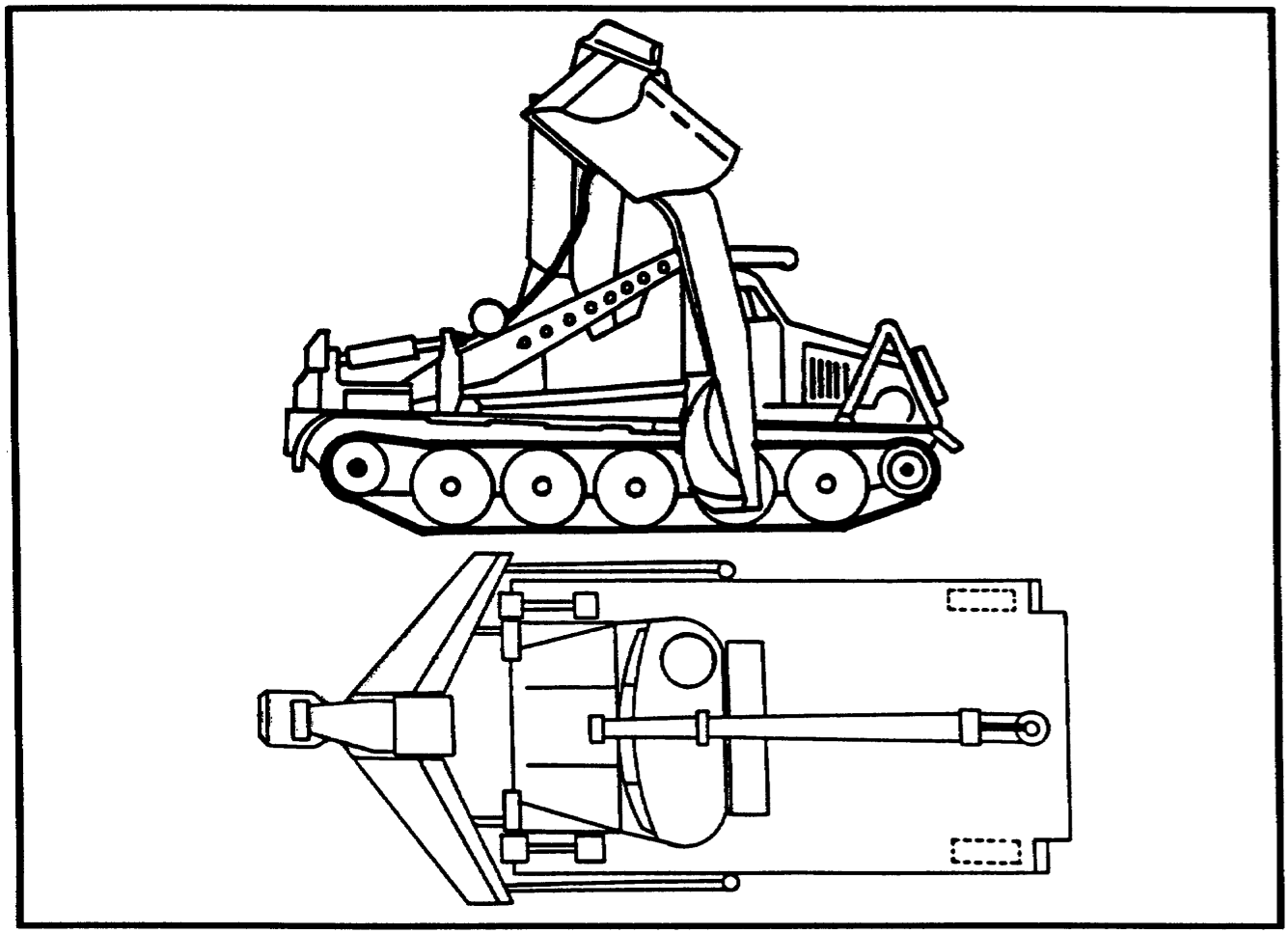


Figure 3-11. Tractor Mounted Bulldozer BAT-M.

Characteristics:

1 0.00m long, 4.79m wide.
Vehicle is tracked and has a cab.
No dozer blade is at front of vehicle.
It has a large hydraulically operated bulldozer blade.
Chassis is modified AT-T artillery tractor.
In travel, the blade is raised.
It has a rotary crane.
It is located with engineer battalion of MRD and TD.

Variant: BAT is the older version of the BAT-M, which does not have a crane.

User countries: CIS, Eastern European, and Middle Eastern countries.

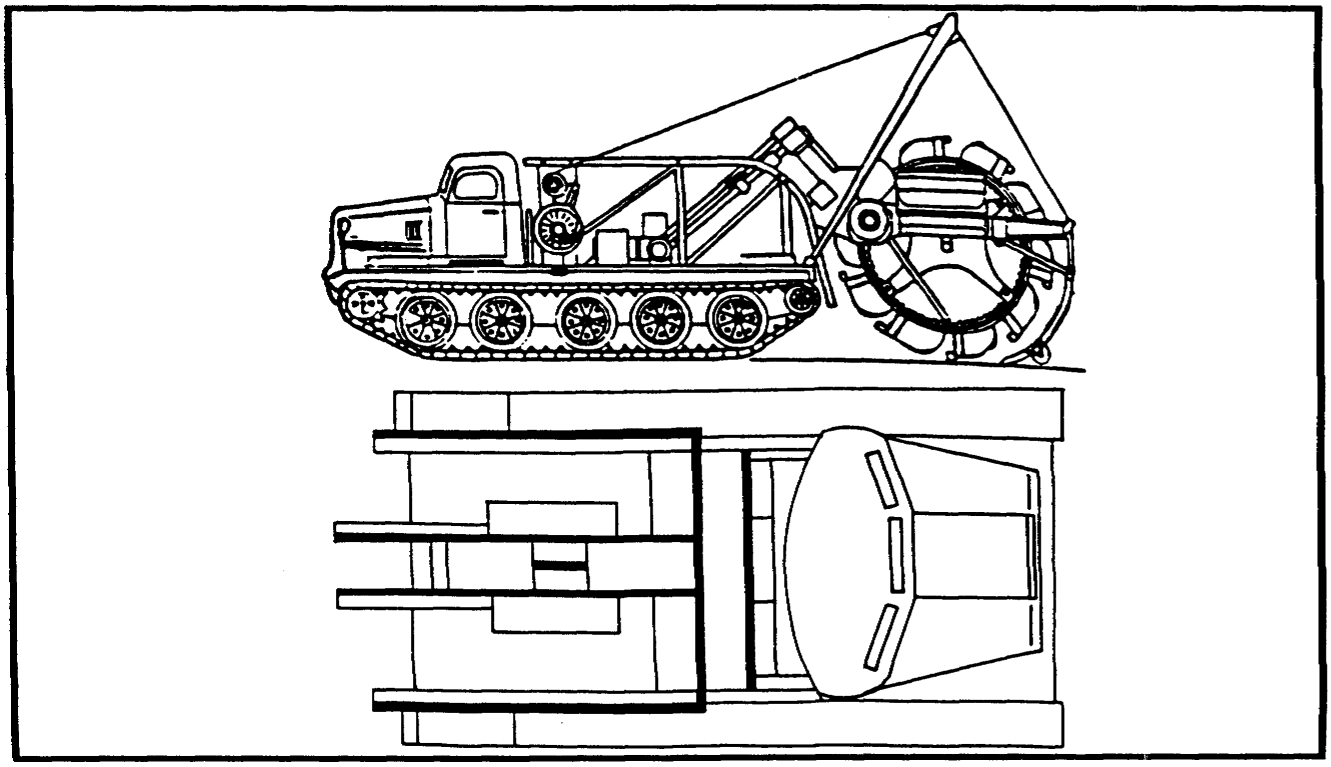


Figure 3-12. Ditching Machine BTM.

Characteristics:

7.22m long, 3.20m wide (in travel).
Equipment is mounted on an AT-T heavy-tracked artillery tractor chassis.
Vehicle has a cab.
No dozer blade is at front of vehicle.
It is a 12 x bucket, wheel-type ditching machine.
It has a tapered hood on truck-type cab.
There is a large support post on each side of excavator.
A prominent bar extends across excavator wheel.
It is located with the technical company of the engineer battalion of the MRD and TD (MDK-2 or BTM).

Variants: BTM-3 has 10 x buckets.
BTM-TMC has ability to dig frozen ground; sometimes has only 8 x buckets.
BTM-TMG has shorter length in operating position (7.60m).

NOTE: Vertical view is in travel mode; side view is in operational mode.

User countries: CIS, Eastern European, Middle Eastern and North African countries.

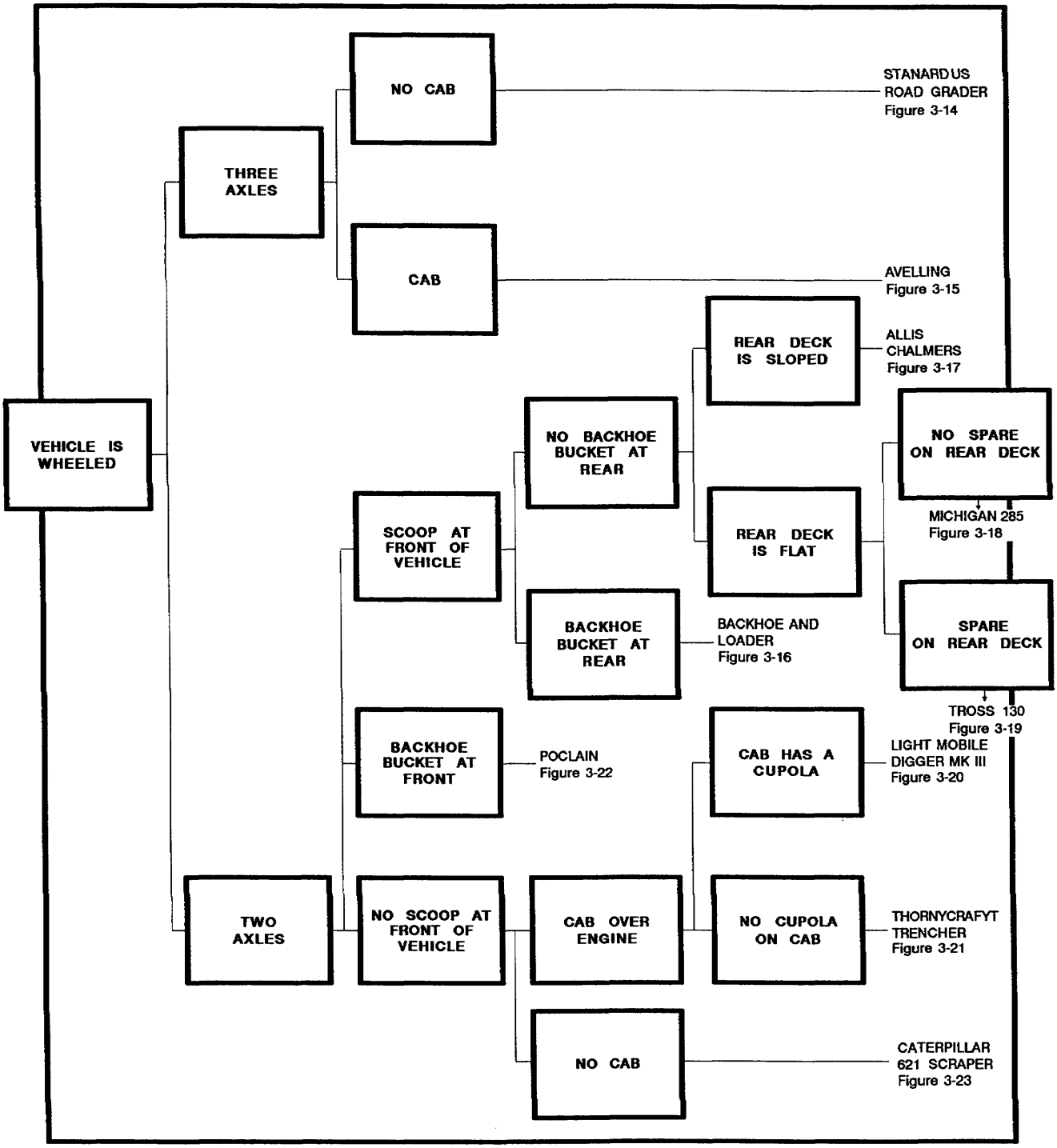

VEHICLE IS WHEELED
THREE AXLES
TWO AXLES
NO CAB
CAB
SCOOP AT FRONT OF VEHICLE
BACKHOE BUCKET AT FRONT
NO SCOOP AT FRONT OF VEHICLE
NO BACKHOE BUCKET AT REAR
BACKHOE BUCKET AT REAR
CAB OVER ENGINE
NO CAB
REAR DECK IS SLOPED
REAR DECK IS FLAT
CAB HAS A CUPOLA
NO CUPOLA ON CAB
NO SPARE ON REAR DECK
SPARE ON REAR DECK
STANARD US ROAD GRADER Figure 3-14
AVELLING Figure 3-15
ALLIS CHALMERS Figure 3-17
MICHIGAN 285 Figure 3-18
BACKHOE AND LOADER Figure 3-16
TROSS 130 Figure 3-19
LIGHT MOBILE DIGGER MK III Figure 3-20
POCLAIN Figure 3-22
THORNYCRAFYT TRENCHER Figure 3-21
CATERPILLAR 621 SCRAPER Figure 3-23

Figure 3-13.

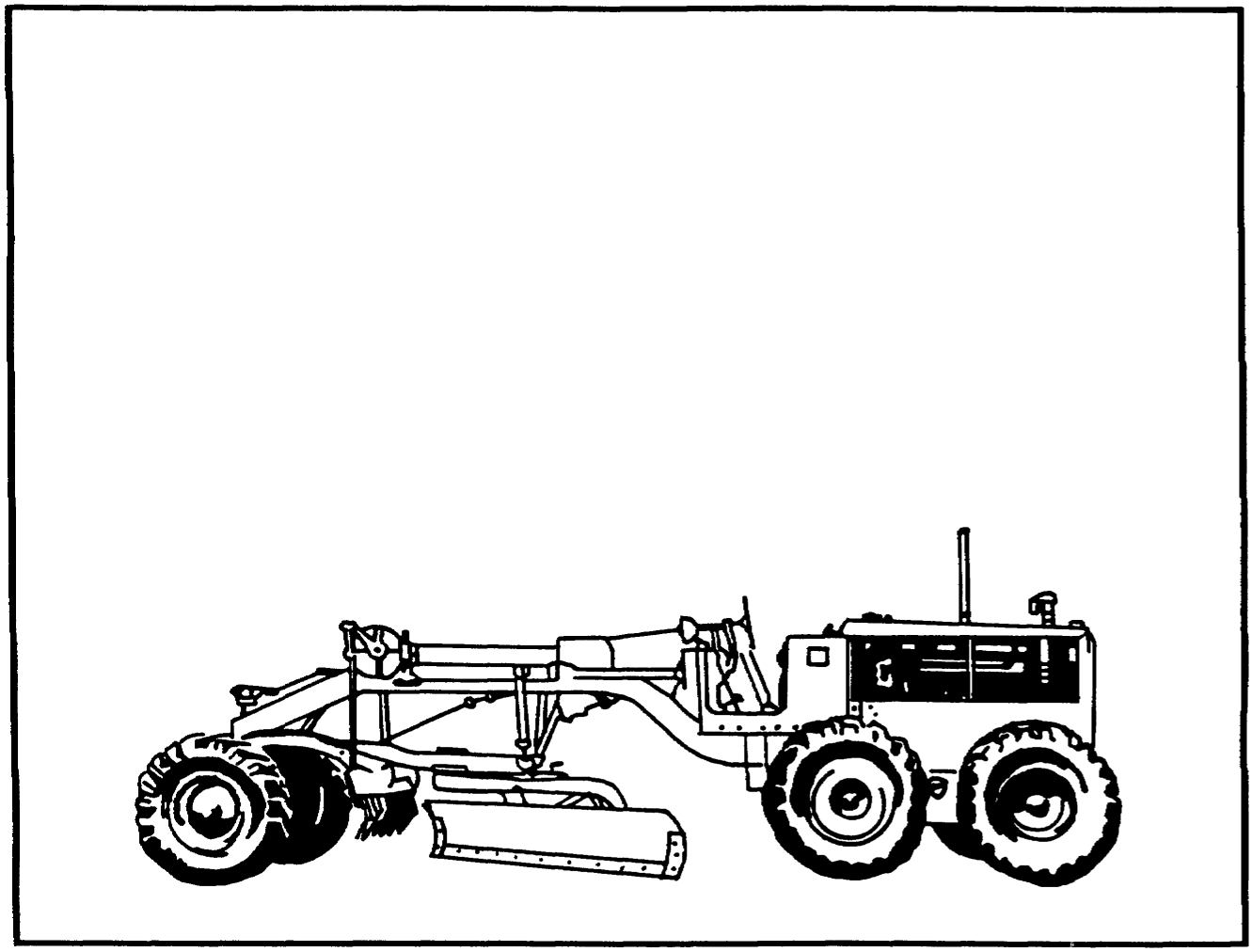


Figure 3-14. Standard Road Grader.

Characteristics:

8.80m long, 2.62m wide.
Vehicle is wheeled.
No cab is present.
It has three axles, one axle to the front, blade forward of center then two axles.
Engine is over two rear axles.
Operator sits just forward of engine.
It is capable of coarse and fine grading, ditching, mixing, spreading, and bank sloping
It is located in engineer battalions at corps and division level.

User country: US.

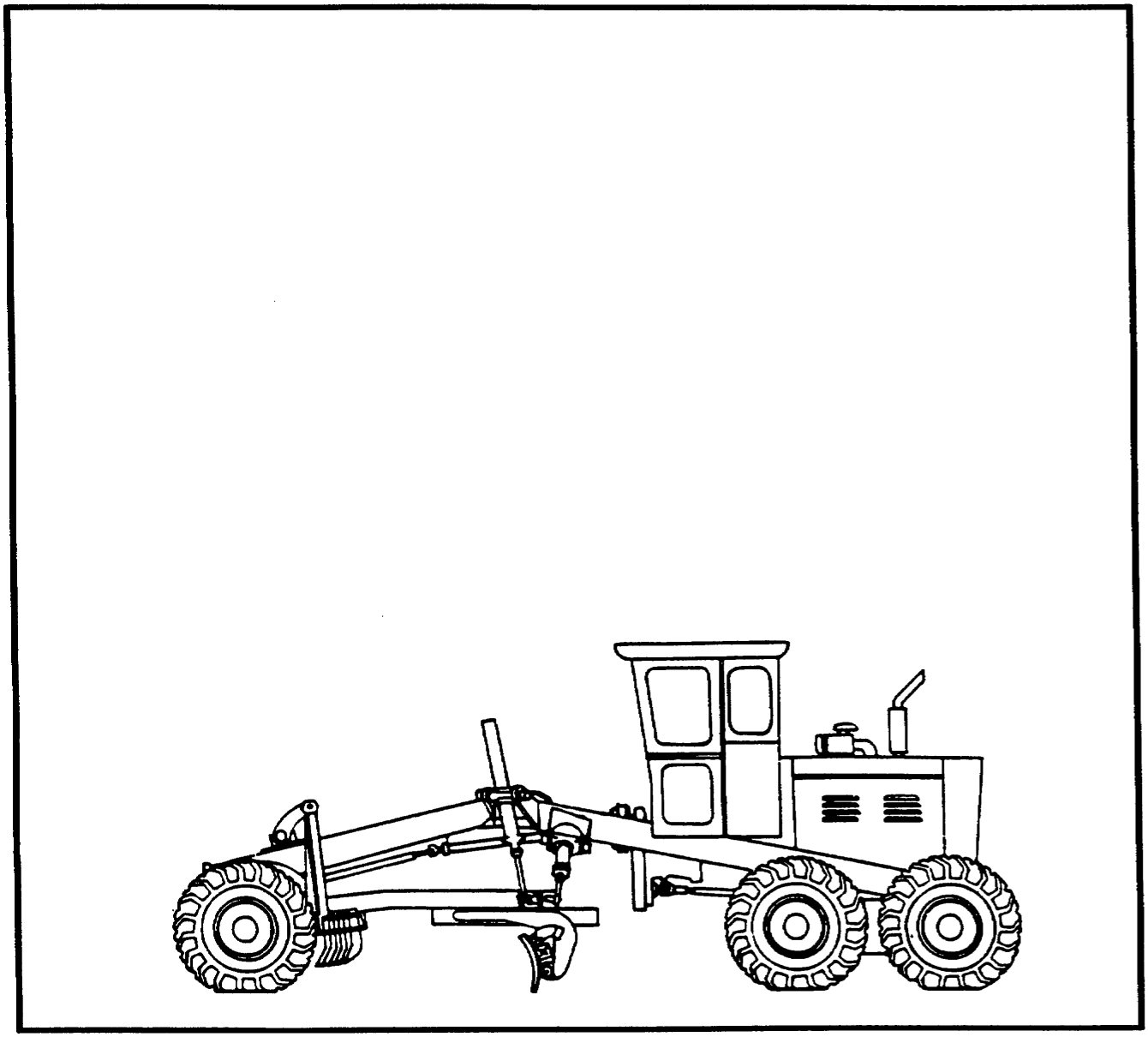


Figure 3-15. Super Motorized Grader Avelling-Barford.

Characteristics:

7.79m long, 2.43m wide.
Wheeled vehicle has three axles.
Engine is mounted at rear with the cab directly in front.
Airstack is on engine deck.

User countries: Egypt, Iran, Jordan, Libya, Malaysia, New Zealand, Yugoslavia, and Zaire.

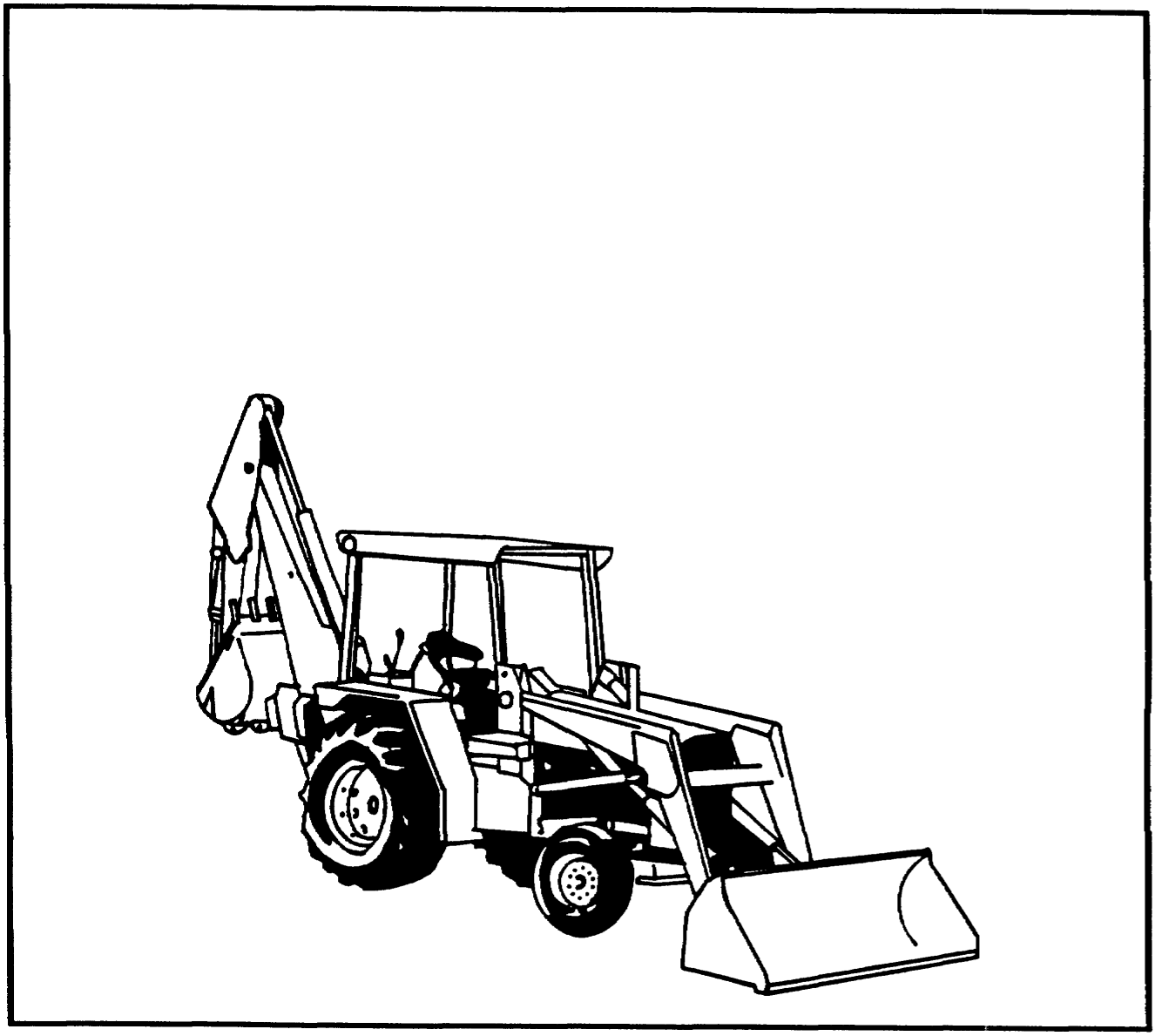


Figure 3-16. Backhoe and Loader.

Characteristics:

7.80m long, 2.66m wide.
Two axles, small wheels are to the front, large wheels with fenders to the rear.
Scoop loader is at front of vehicle.
Backhoe bucket is to the rear.
It is an item of commercial construction equipment.

User country: US.

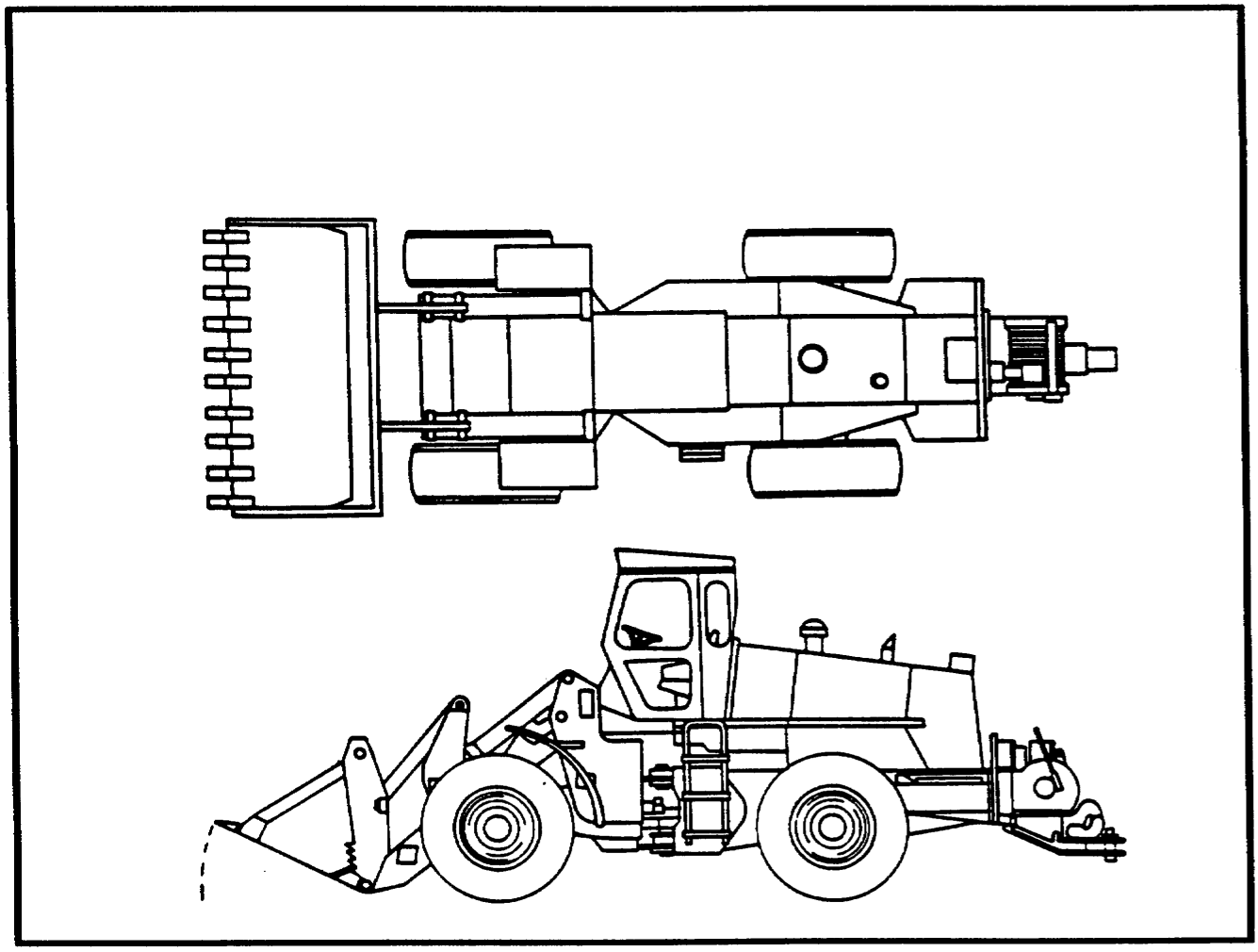


Figure 3-17. Excavator Allis Chalmers 645M.

Characteristics:

8.20m long, 2.79m wide.
Vehicle has two axles.
It is a wheeled scoop loader.
Scoop is mounted at front of vehicle.
No backhoe bucket is at rear.
Rear deck is sloped.
Engine is to the rear.
It is capable of dozing, scooping, and loading.
It provides earth moving capability for line companies.

User countries: US.

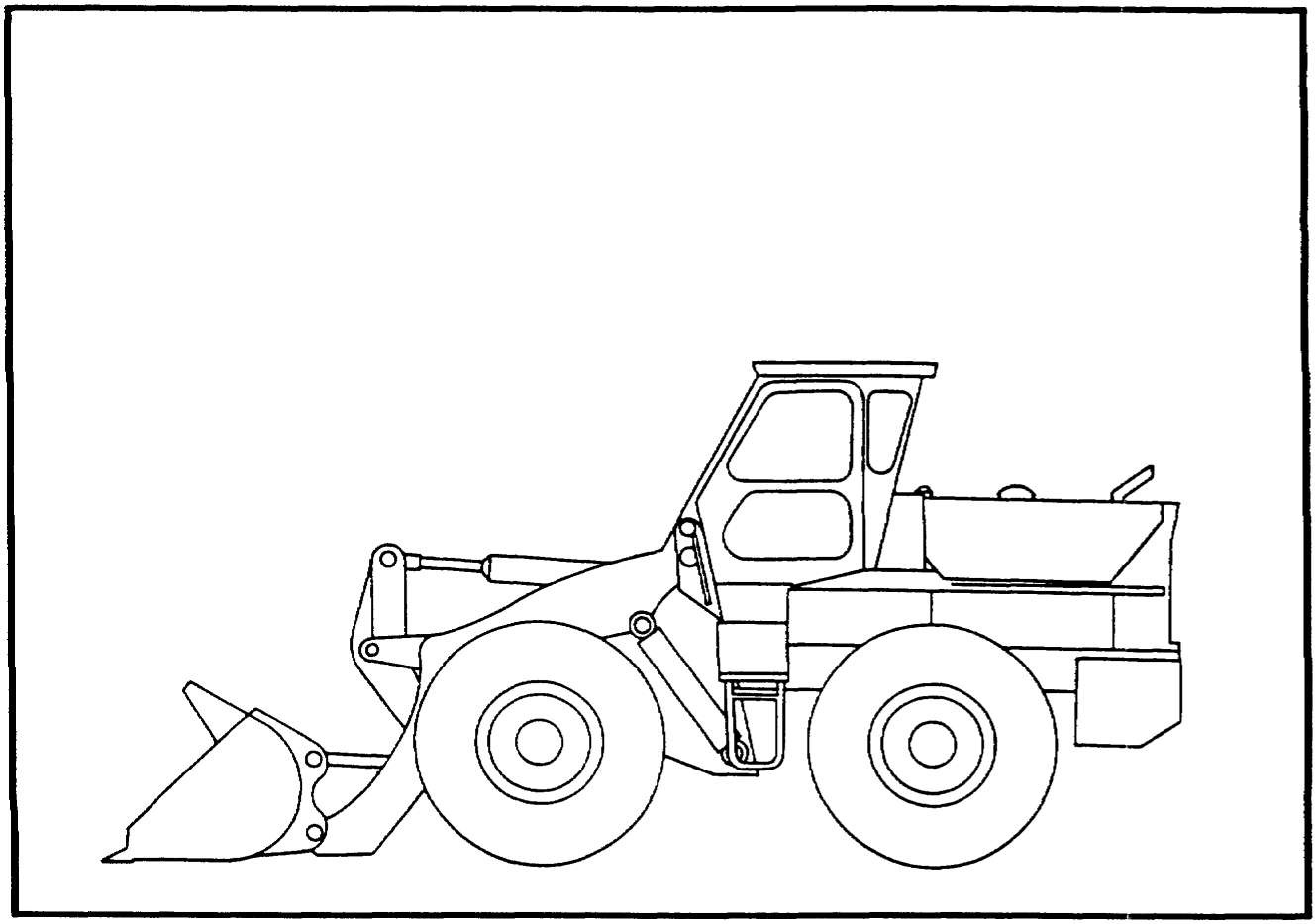


Figure 3-18. Excavator/Bucket Loader Michigan 285.

Characteristics:

9.78m long, 3.58m wide.
Wheeled vehicle has two axles.
Scoop is mounted at front of vehicle.
No backhoe bucket is mounted at rear.
Rear deck is flat.
No spare is on rear deck.
It has two axles.

User country: US

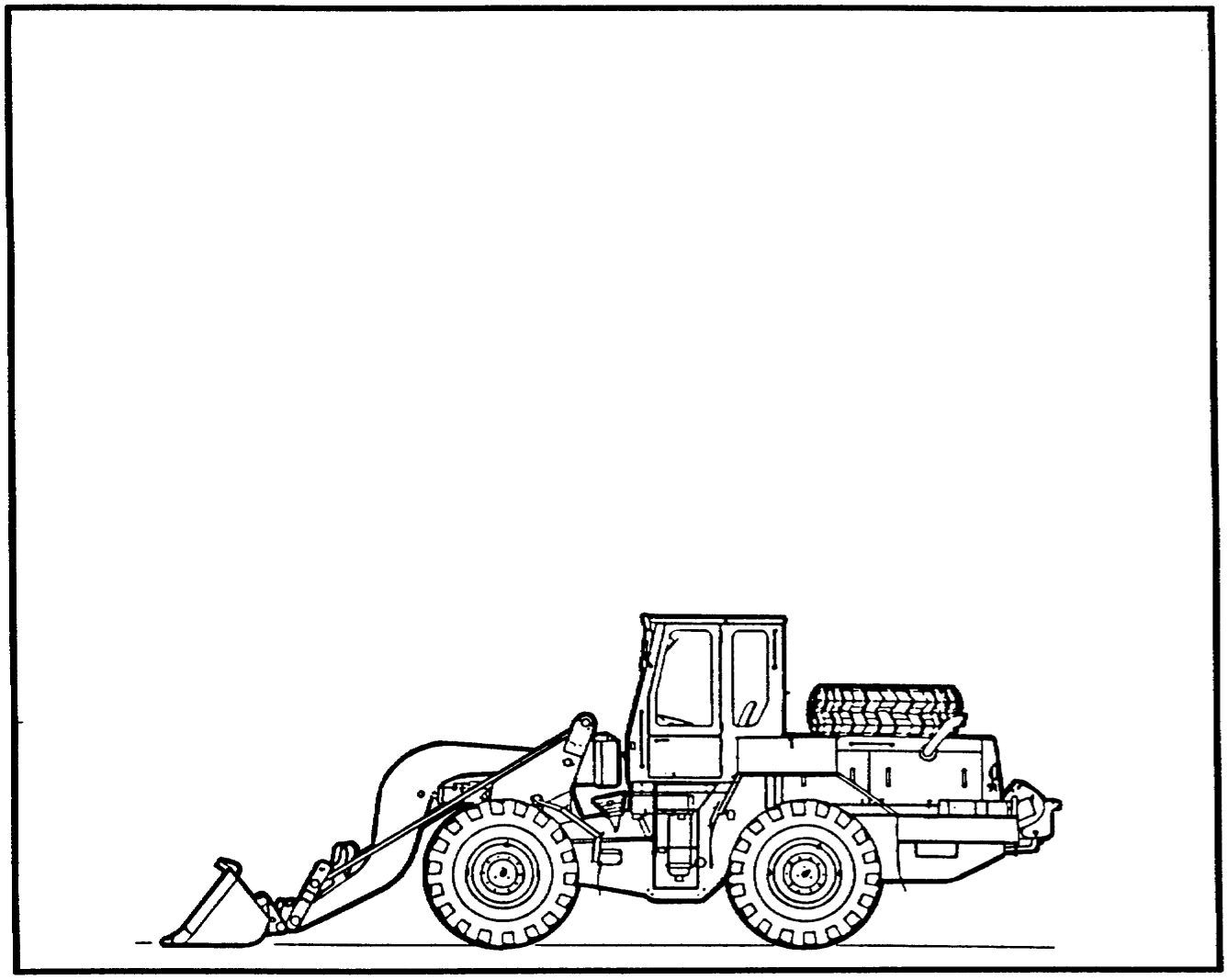


Figure 3-19. Multi-Purpose Vehicle Voest-Alpine Tross-130.

Characteristics:

Measurements are not available.
Wheeled vehicle has two axles.
Scoop is mounted at front of vehicle.
No backhoe bucket is mounted at rear.
Rear deck is flat and has a spare tire.

User country: Austria.

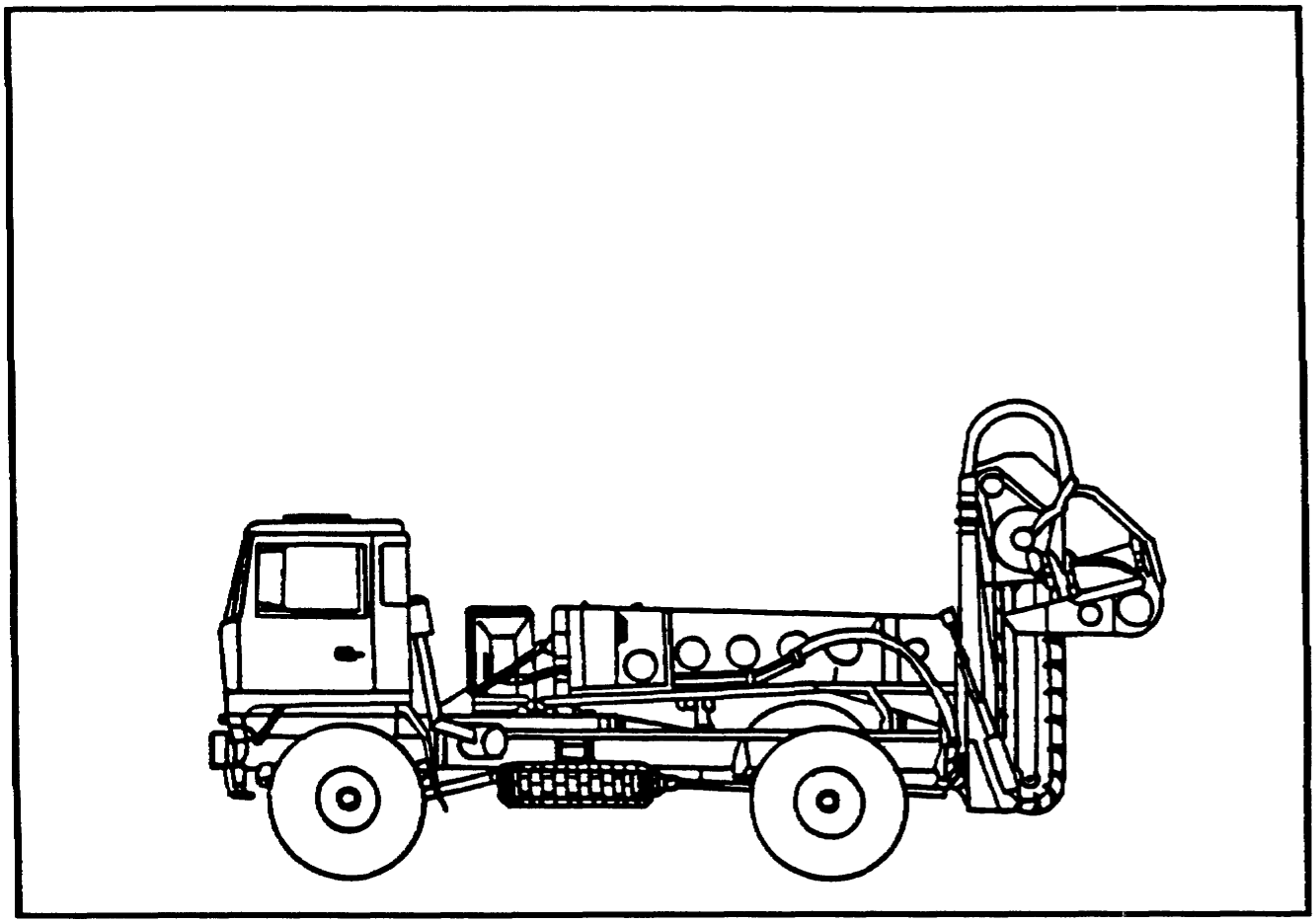


Figure 3-20. Field Fortification Equipment, Light Mobile Digger Mk-lll.

Characteristics:

7.50m long (in travel), 2.50m wide.
Vehicle is wheeled and has two axles.
No scoop is at front of vehicle.
Cab is over engine of new Bedford TM-4-4 chassis. Cab has a cupola.
Chassis has two parallel boom arms on vertical pivots approximately mid-way along the wheelbase.
Digging head is mounted at rear is made up of a jib which carries the digging chains.

Variant: Light Mobile Digger MK-I is 6.59m long in travel. The cab has the driver's seat to the right and the engine to the left.

User country: UK.

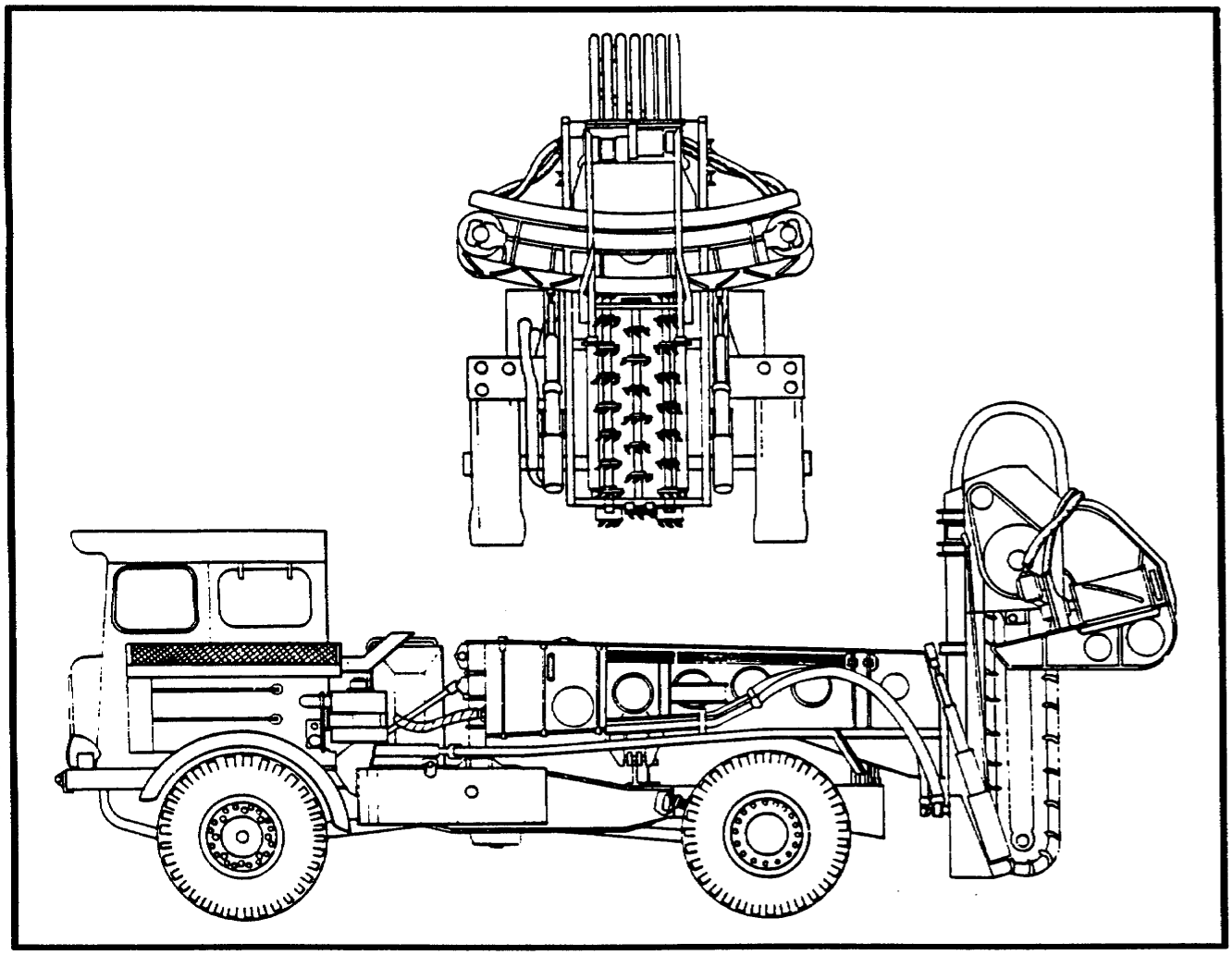


Figure 3-21. Field Fortification Equipment, Thornycraft Nubian Trencher.

Characteristics:

6.59m long, 2.31 m wide.
Wheeled vehicle has two axles.
No scoop is at front of vehicle.
The cab over engine has no cupola on the roof.
Rounded fenders are over front tires.
Maximum cutting depth is 1.38m.

User country: UK.

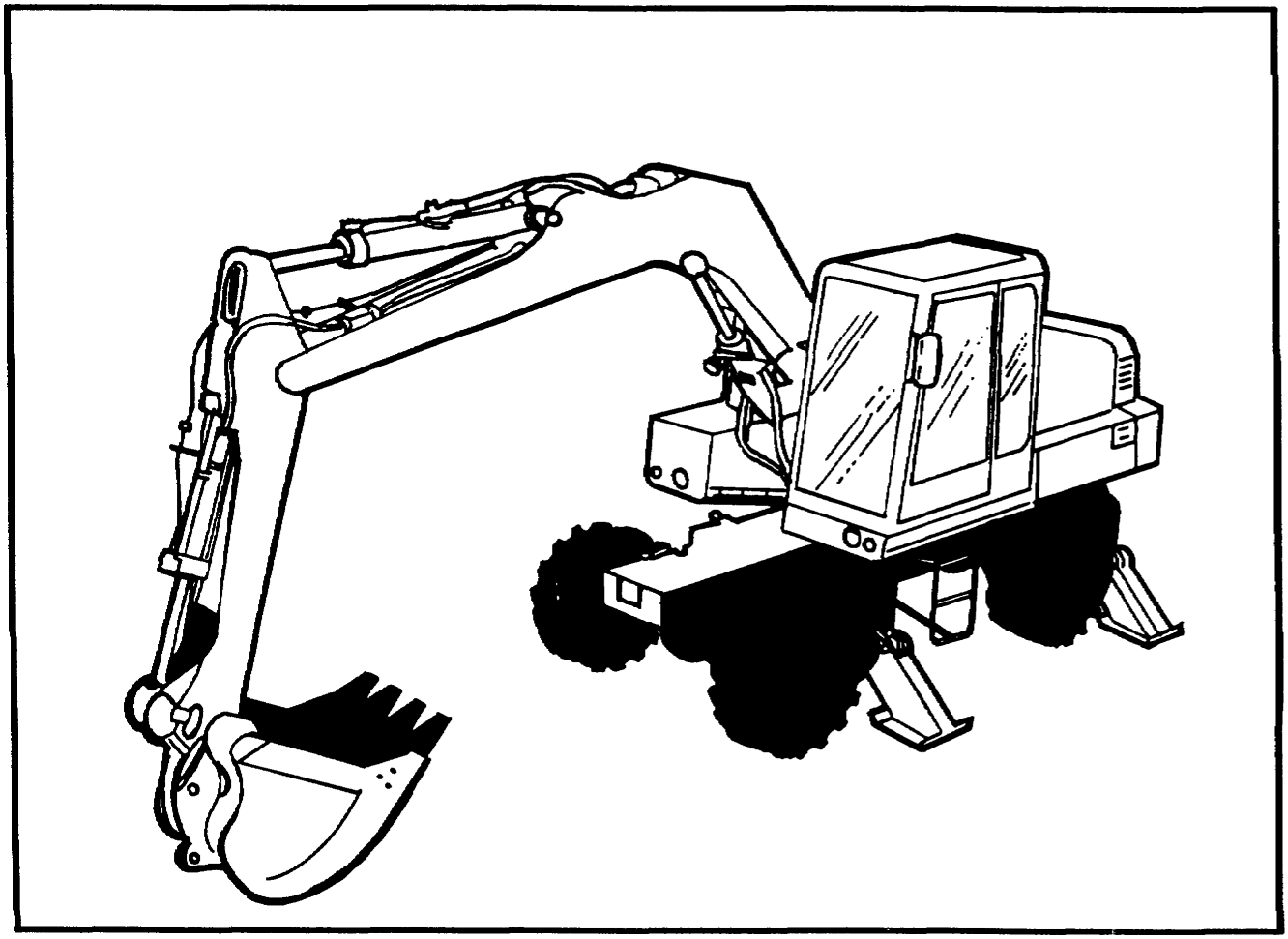


Figure 3-22. Excavator Poclain.

Characteristics:

4.86m long, 2.49m wide.
Wheeled vehicle has two axles.
Backhoe bucket is at front.
One-man cab is at left front of engine.
It uses stabilizers.

User country: France.

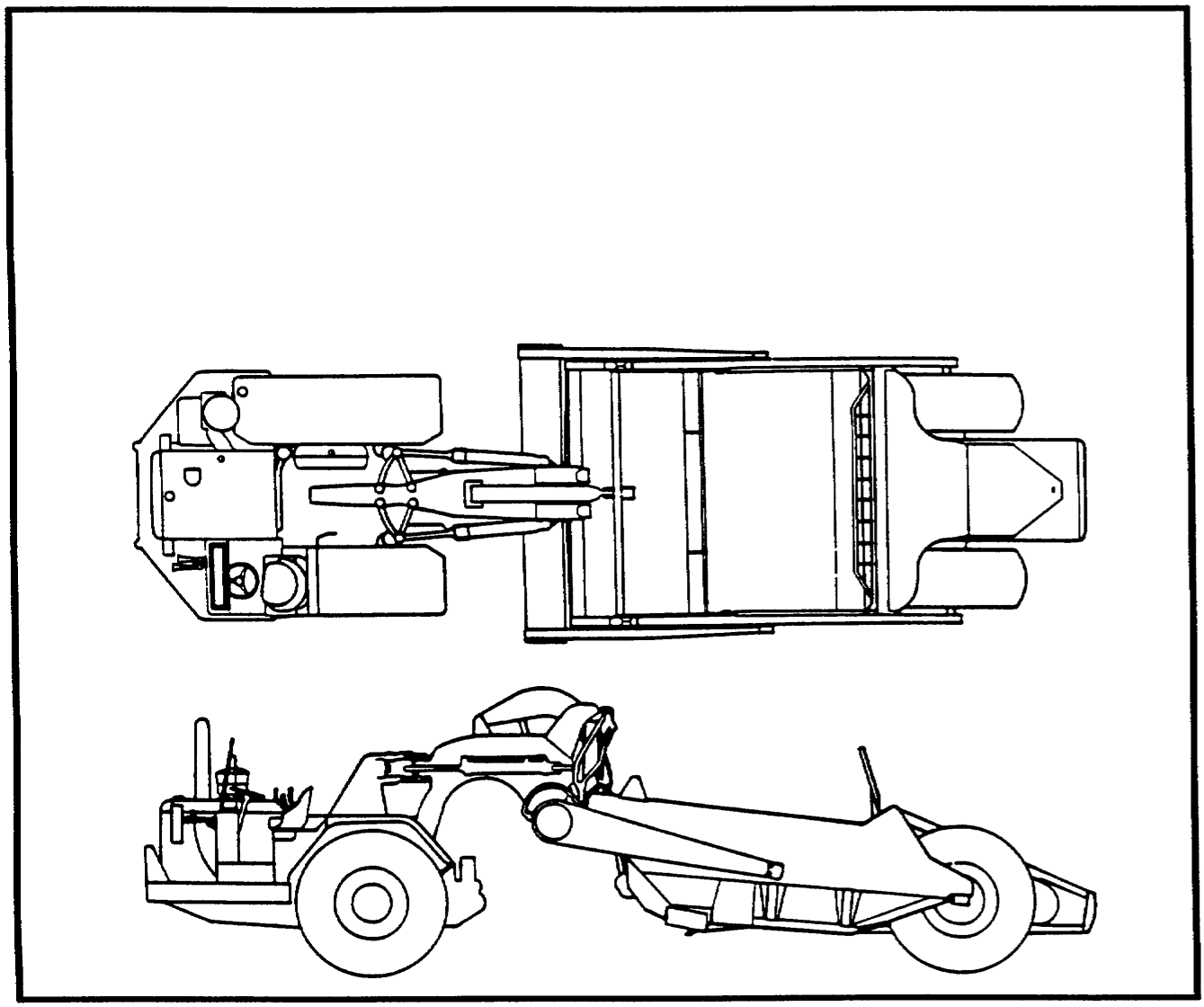


Figure 3-23. Motorized Scraper Caterpillar 621.

Characteristics:

11.60m long, 3.53m wide.
Wheeled vehicle has two axles.
No scoop is at front or cab on vehicle.
Scraper is across center of vehicle.

User country: UK.

PART D: IDENTIFICATION CHARACTERISTICS OF CRANES

1. Cranes are used for loading, unloading, recovery work, bridge assembly, and draglines.

2. Cranes are usually commercial items purchased and adopted for military use. However, the US 5-ton rough terrain crane (Figure 3-26) and the 20-ton rough terrain crane were specifically developed for military use.

3. The following dichotomous-type elimination key identifies selected world cranes. Use this key for lesson purposes only.

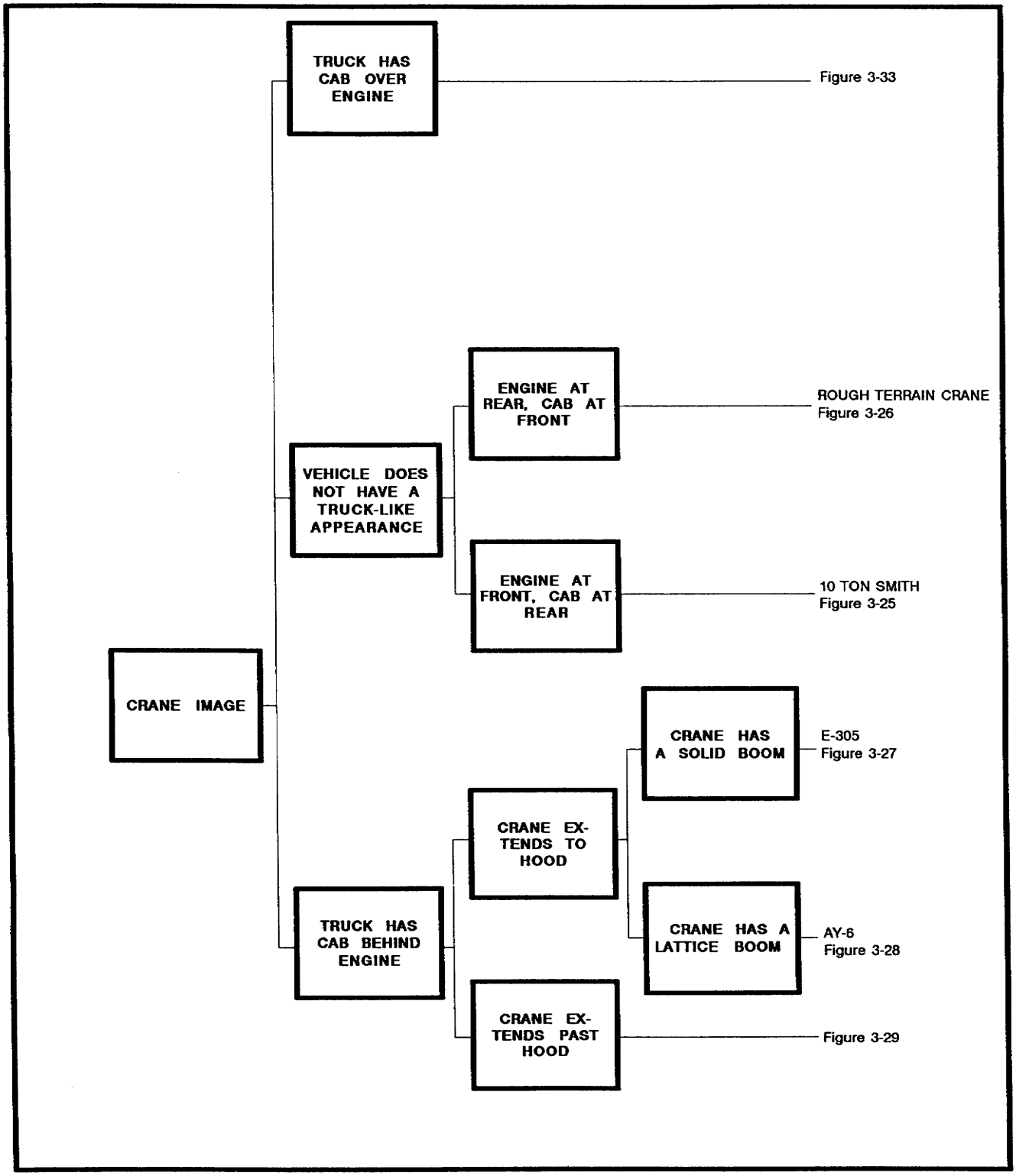

CRANE IMAGE
TRUCK HAS CAB OVER ENGINE
Figure 3-33
VEHICLE DOES NOT HAVE A TRUCK-LIKE APPEARANCE
ENGINE AT REAR, CAB AT FRONT
ROUGH TERRAIN CRANE
Figure 3-26
ENGINE AT FRONT, CAB AT REAR
10 TON SMITH
Figure 3-25
TRUCK HAS CAB BEHIND ENGINE
CRANE EX-TENDS TO HOOD
CRANE HAS A SOLID BOOM
E-305
Figure 3-27
CRANE HAS A LATTICE BOOM
AY-6
Figure 3-28
CRANE EX-TENDS PAST HOOD
Figure 3-29

Figure 3-24.

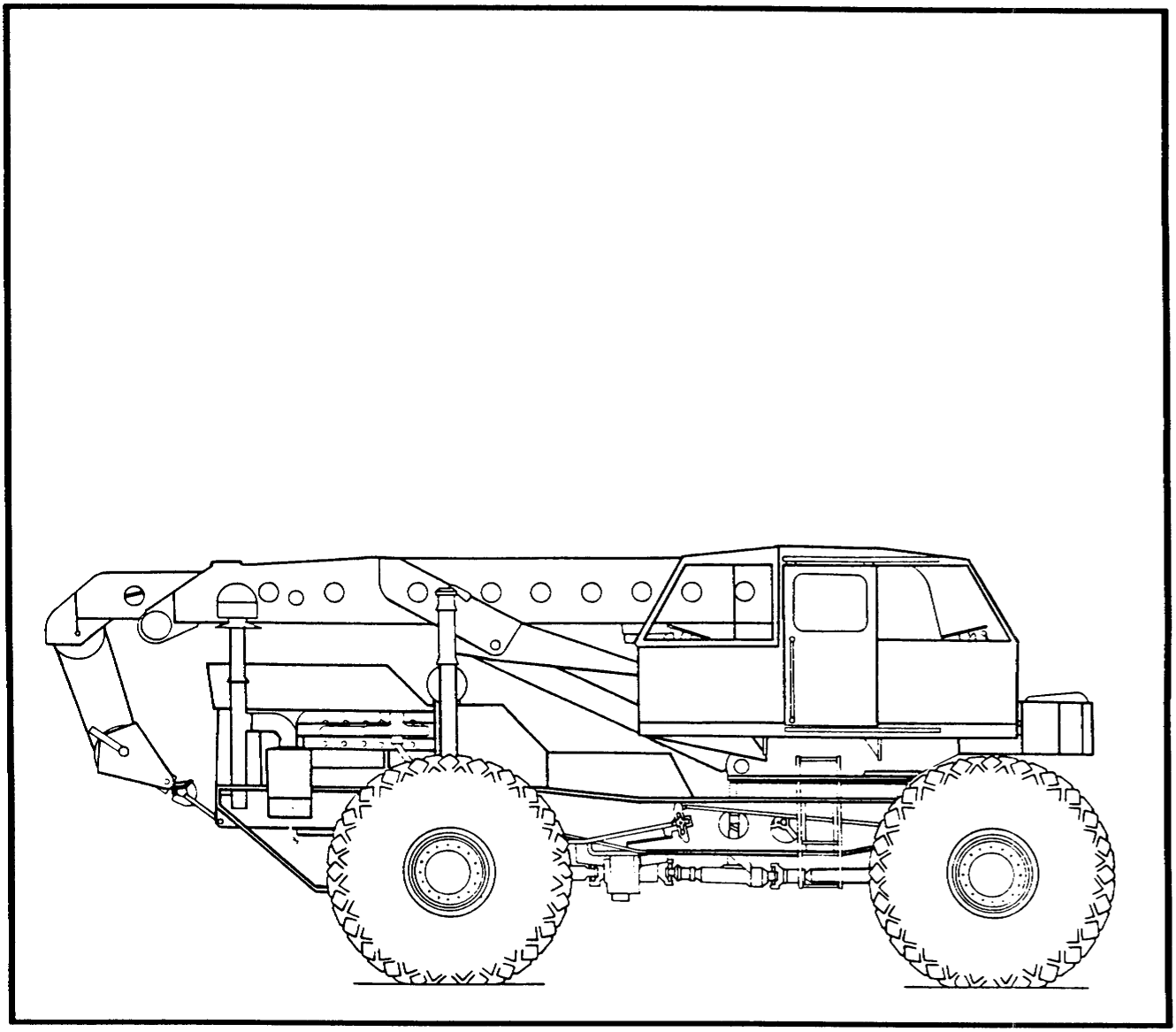


Figure 3-25. 10-Ton Rough Terrain Crane Smith.

Characteristics:

8.59m long, 3.20m wide.
Vehicle does not have a truck-like appearance.
Two axle vehicle has the engine at the front and the cab to the rear.
It is designed for bridging and stores handling.
It is waterproofed for wading in depths up to 1.98m.

User country: UK.

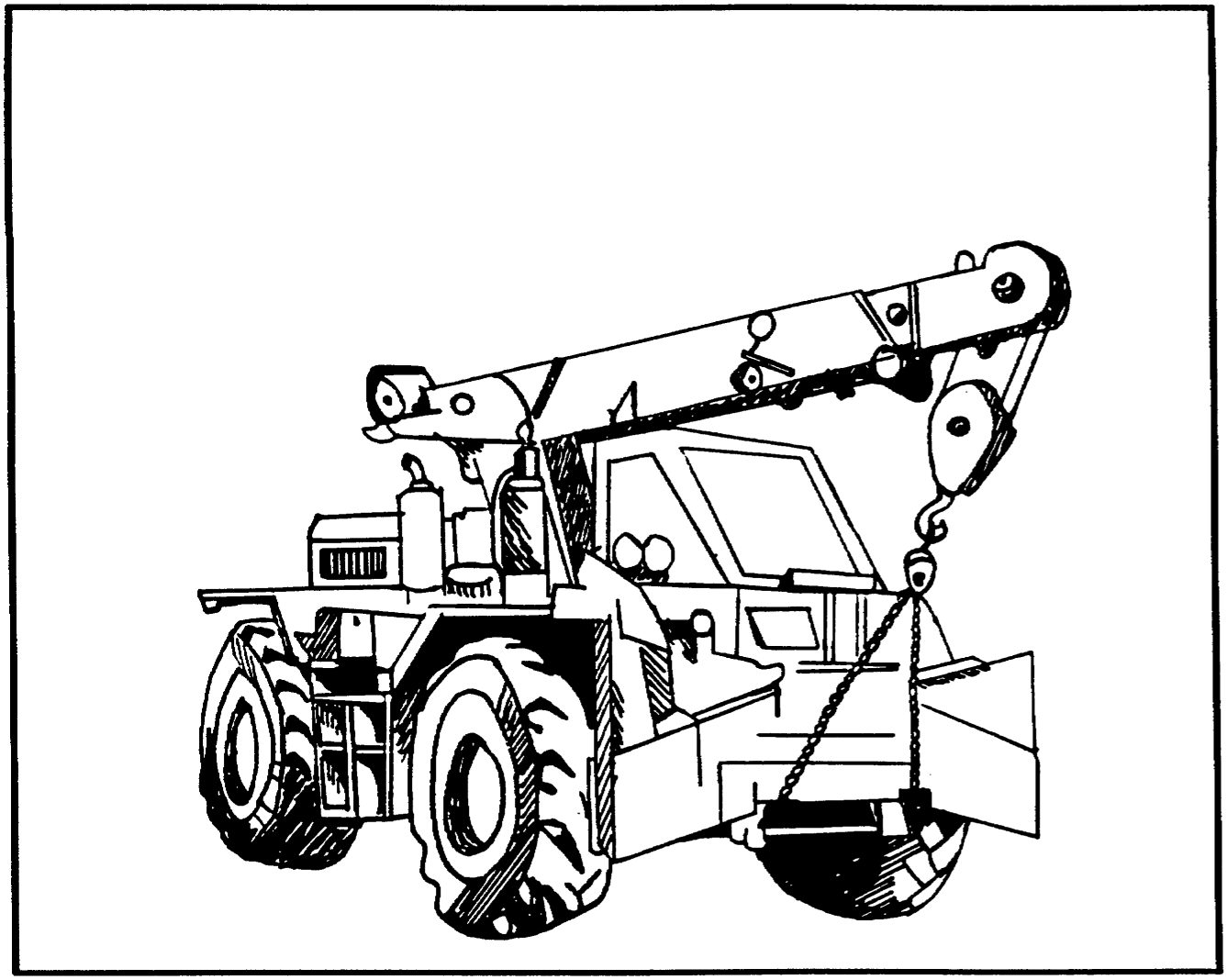


Figure 3-26. 5-Ton Crane Rough Terrain.

Characteristics:

Measurements are not available.
Vehicle does not have a truck-like appearance.
There is a fully enclosed cab at front of vehicle with engine at rear.
Crane has telescopic jib that has a maximum reach of 7.62m.
It can traverse 360°.
Folding stabilizer leg is at each corner of the vehicle.

Variants: Some models have a dozer blade at front.

User country: US.

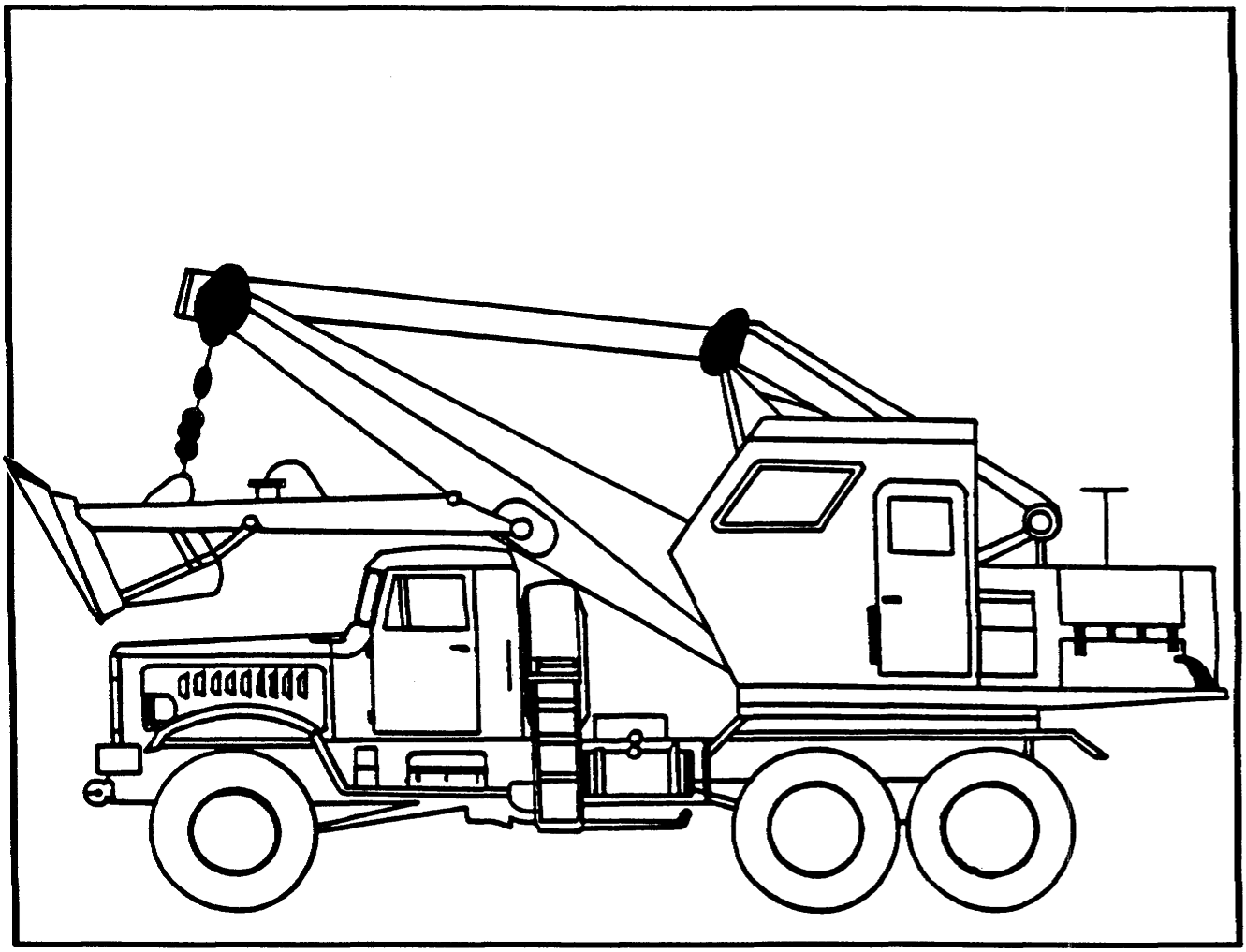


Figure 3-27. Crane Shovel Excavator E-305V.

Characteristics:

1 0.00m long, 2.70m wide.
Truck has cab behind engine.
Crane shovel extends over truck cab to the end of the hood.
Crane has a solid boom.
It is mounted on a KrAZ-214 chassis.
Operator's cabin is at the rear of cargo bed.
It can be used as a digging machine or a crane.
Spare tire is carried directly behind the cab.

User country: Czech Republic and Slovenia.

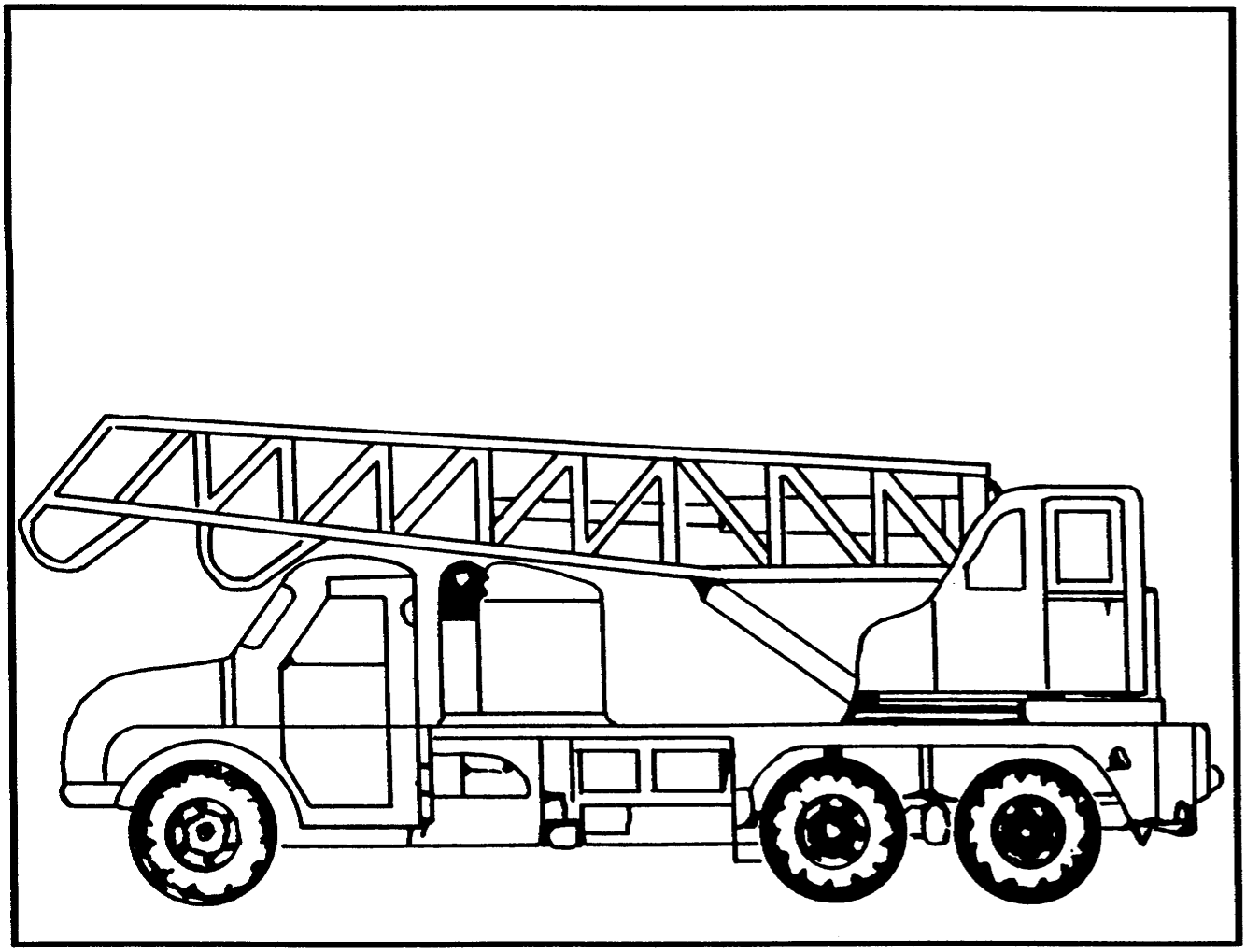


Figure 3-28. Mobile Crane AY-6.

Characteristics:

8.30m long, 2.50m wide (truck chassis).
Truck has cab behind engine.
Hydraulic crane has 3600 traverse and extends over truck cab to the end of the hood.
Crane has a lattice boom.
It is mounted on a Tatra-1 =11 NR or Tatra-138 chassis.
Operator's cabin sits at the rear of the cargo bed.
There are three axles.

Variant: AV-8 is a crane/shovel on Tatra-138 chassis.

User country: Czech Republic and Slovenia.

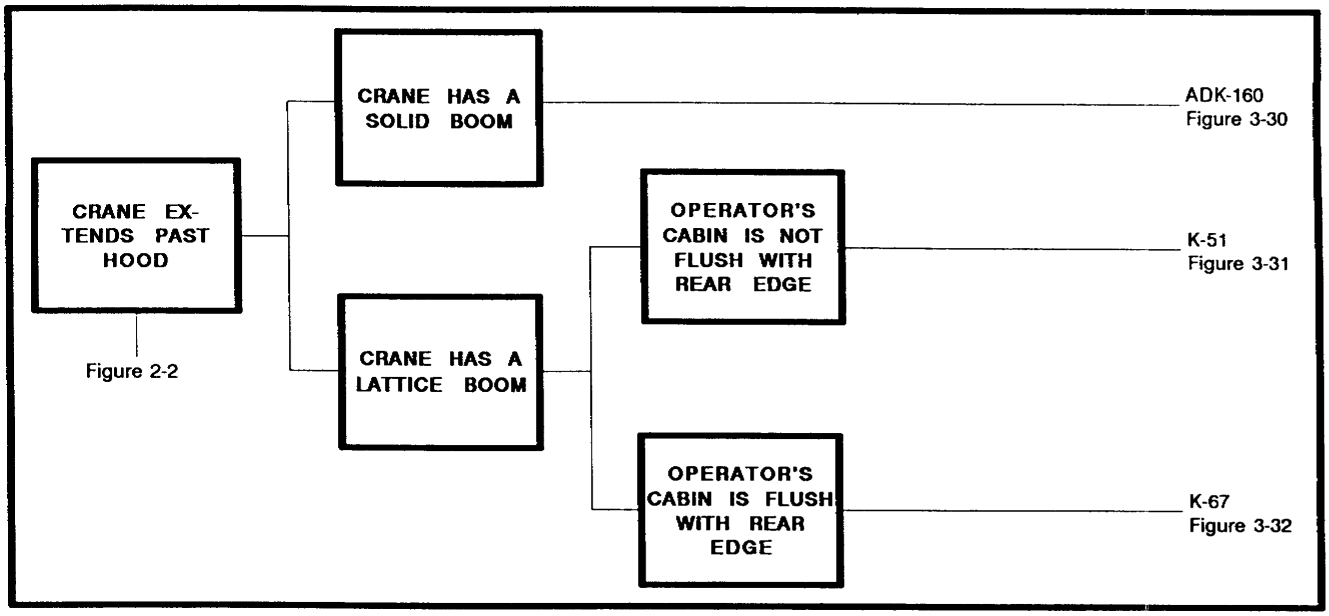

CRANE EX-
TENDS PAST
HOOD
Figure 2-2
CRANE HAS A
SOLID BOOM
CRANE HAS A
LATTICE BOOM
OPERATOR'S
CABIN IS NOT
FLUSH WITH
REAR EDGE
OPERATOR'S
CABIN IS FLUSH
WITH REAR
EDGE
ADK-160
Figure 3-30
K-51
Figure 3-31
K-67
Figure 3-32

Figure 3-29.

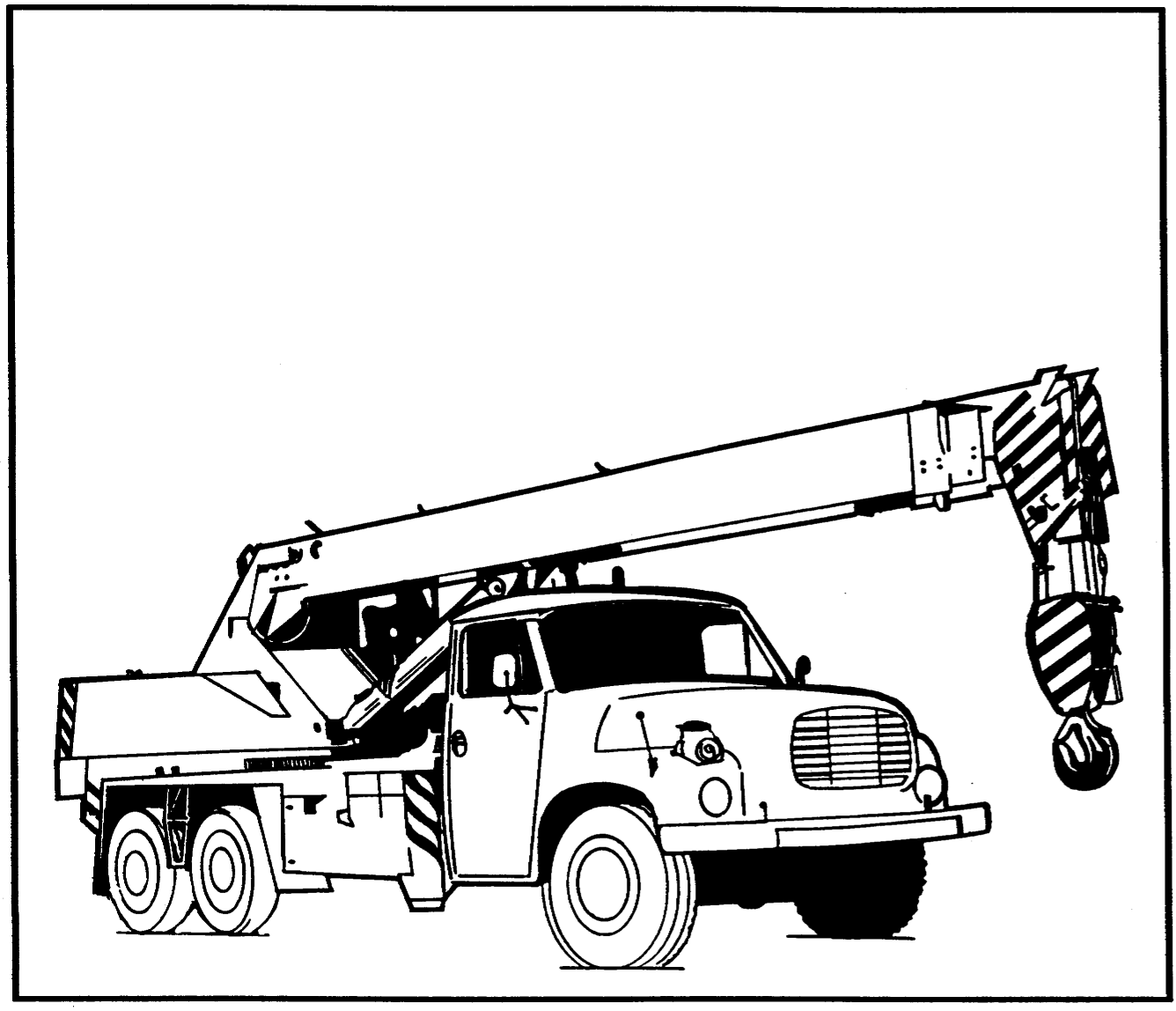


Figure 3-30. 16-ton Mobile Crane ADK-160.

Characteristics:

9.85m long, 2.00m wide.
Truck has cab behind engine.
Crane is mounted on bed of truck and a solid boom extends over cab and past hood.
There are three axles.
Crane is mounted on a Tatra-138 chassis.

User countries: Eastern European countries.

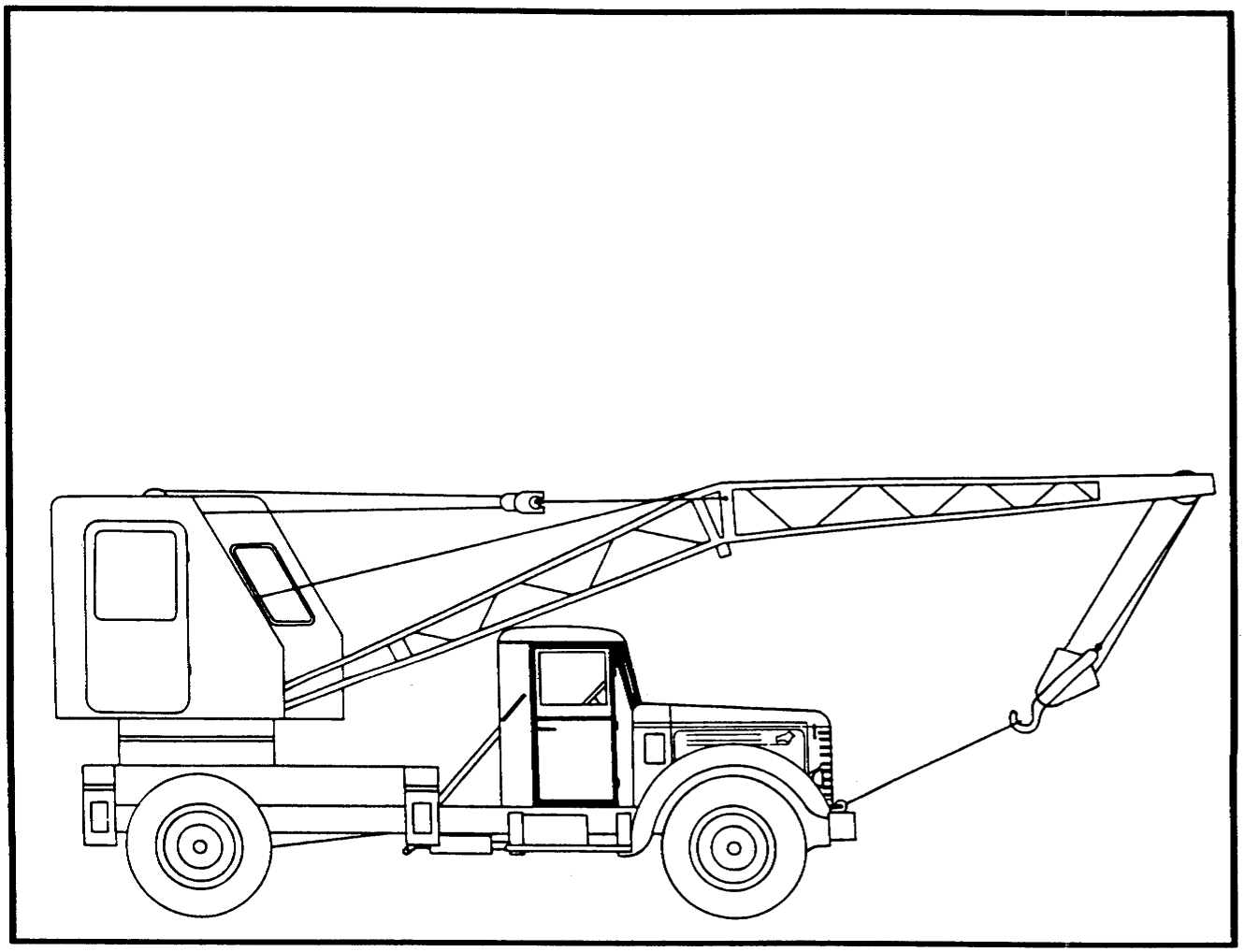


Figure 3-31. Crane K-51.

Characteristics:

10.10m long, 2.70m wide.
Truck has cab behind engine.
Crane extends past hood and has a lattice boom.
Operator's cabin sits at rear of cargo bed and is not flush with the rear edge.
Boom can be extended or straightened.
Clamshell or dragline can be fitted.
There are two axles.
Crane is mounted on a MAZ-200 chassis.

Variant: K-61 has hinged outriggers.

User country: CIS.

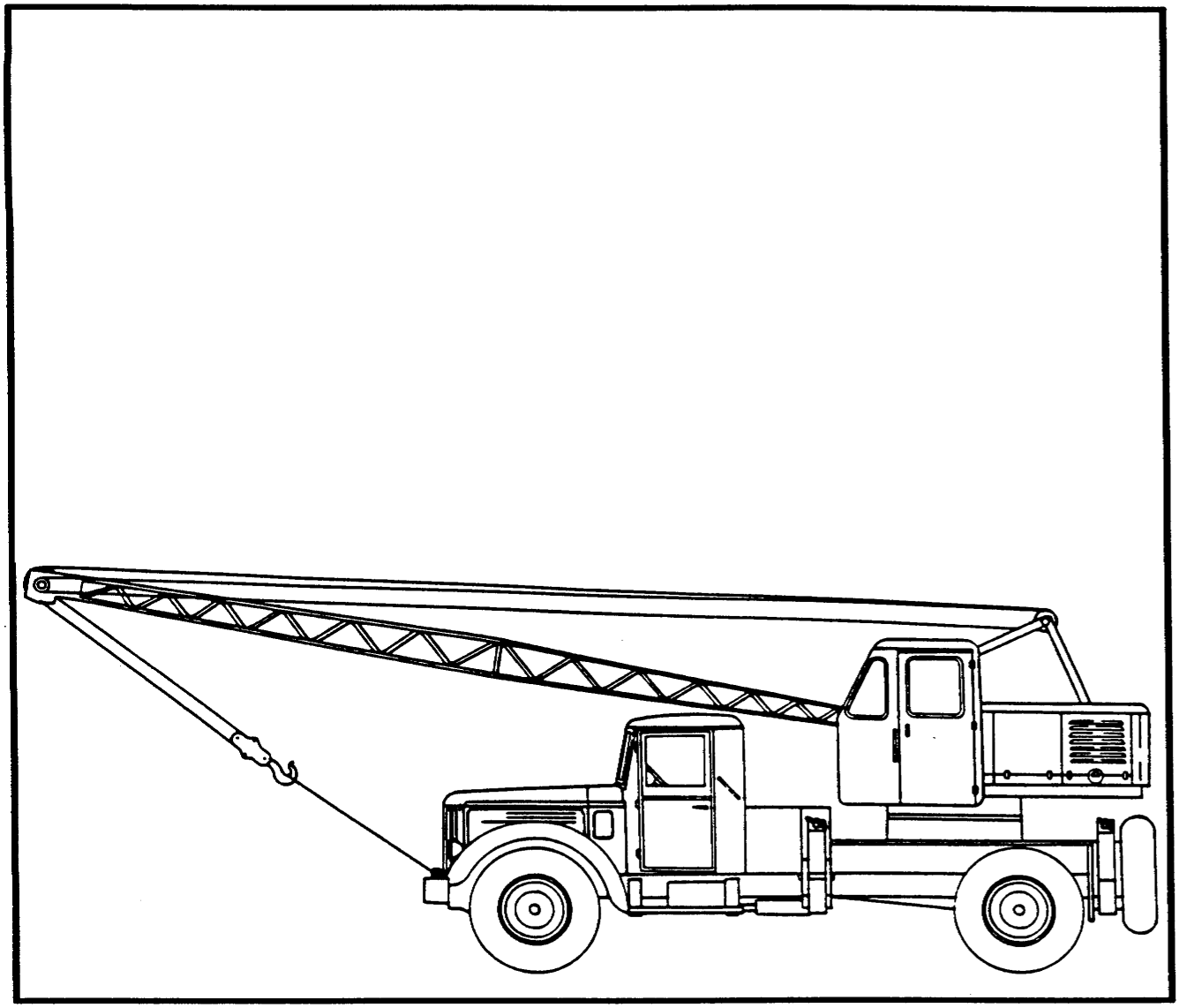


Figure 3-32. Crane K-67.

Characteristics:

10.25m long, 3.00m wide.
Truck has cab behind engine.
Crane extends past hood and has a lattice boom.
Engine is immediately behind operator's cabin flush with rear edge.
Operators cabin is centered on cargo bed.
There are two axles.
Crane is mounted on MAZ-200 chassis.

User country: CIS.

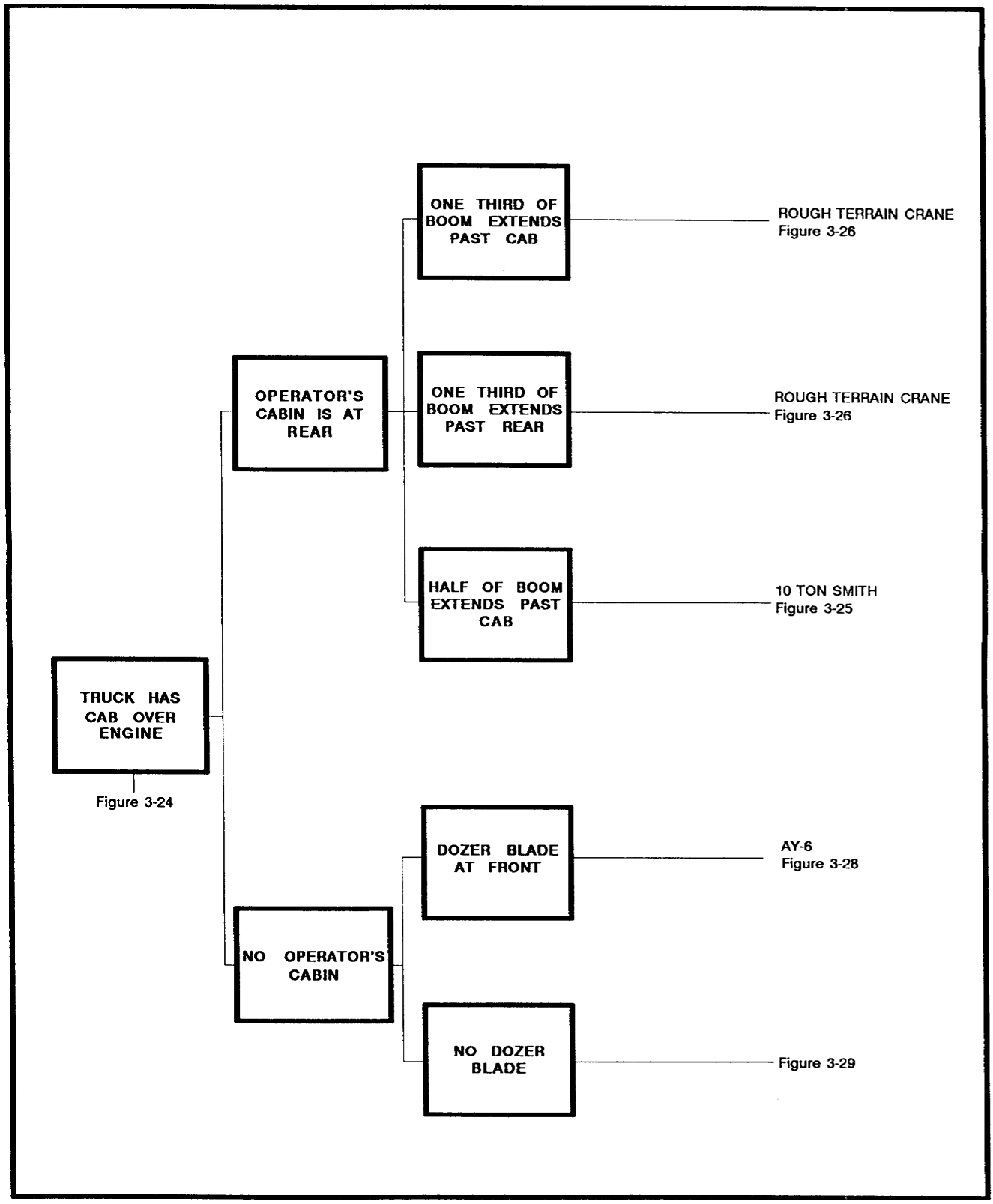

TRUCK HAS CAB OVER ENGINE
Figure 3-24
OPERATOR'S CABIN IS AT REAR
NO OPERATOR'S CABIN
ONE THIRD OF BOOM EXTENDS PAST CAB
ROUGH TERRAIN CRANE
Figure 3-26
ONE THIRD OF BOOM EXTENDS PAST REAR
ROUGH TERRAIN CRANE
Figure 3-26
HALF OF BOOM EXTENDS PAST CAB
10 TON SMITH
Figure 3-25
DOZER BLADE AT FRONT
AY-6
Figure 3-28
NO DOZER BLADE
Figure 3-29

Figure 3-33.

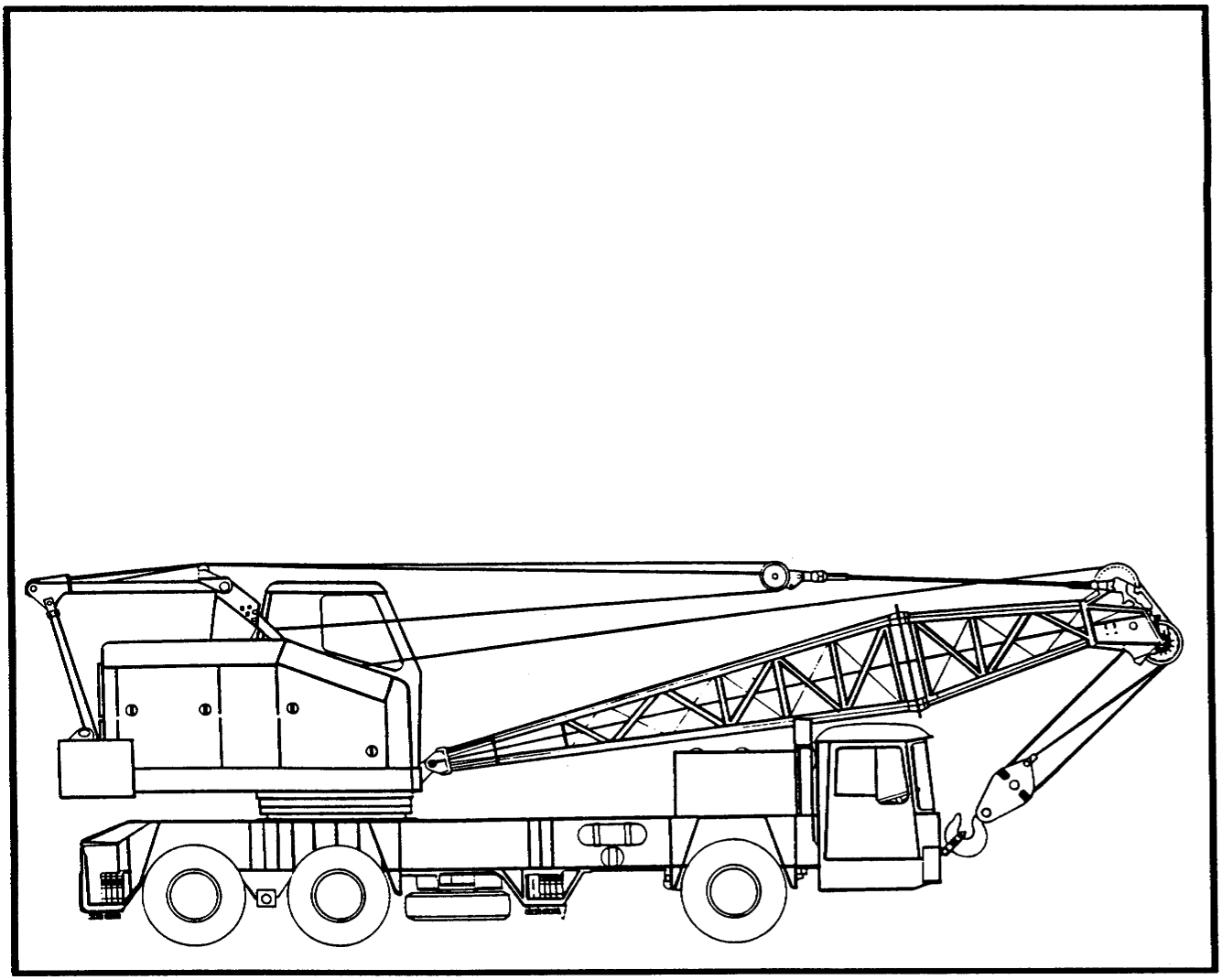


Figure 3-34. Crane Wellman Booth Smith L2825.

Characteristics:

12.04m long, 2.50m wide.
Truck has cab over engine.
Operator's cabin is mounted at the rear.
One third of lattice boom extends past the truck cab.
Vehicle has three axles.
Boom can be extended to a maximum of 35.00m.

User country: UK.

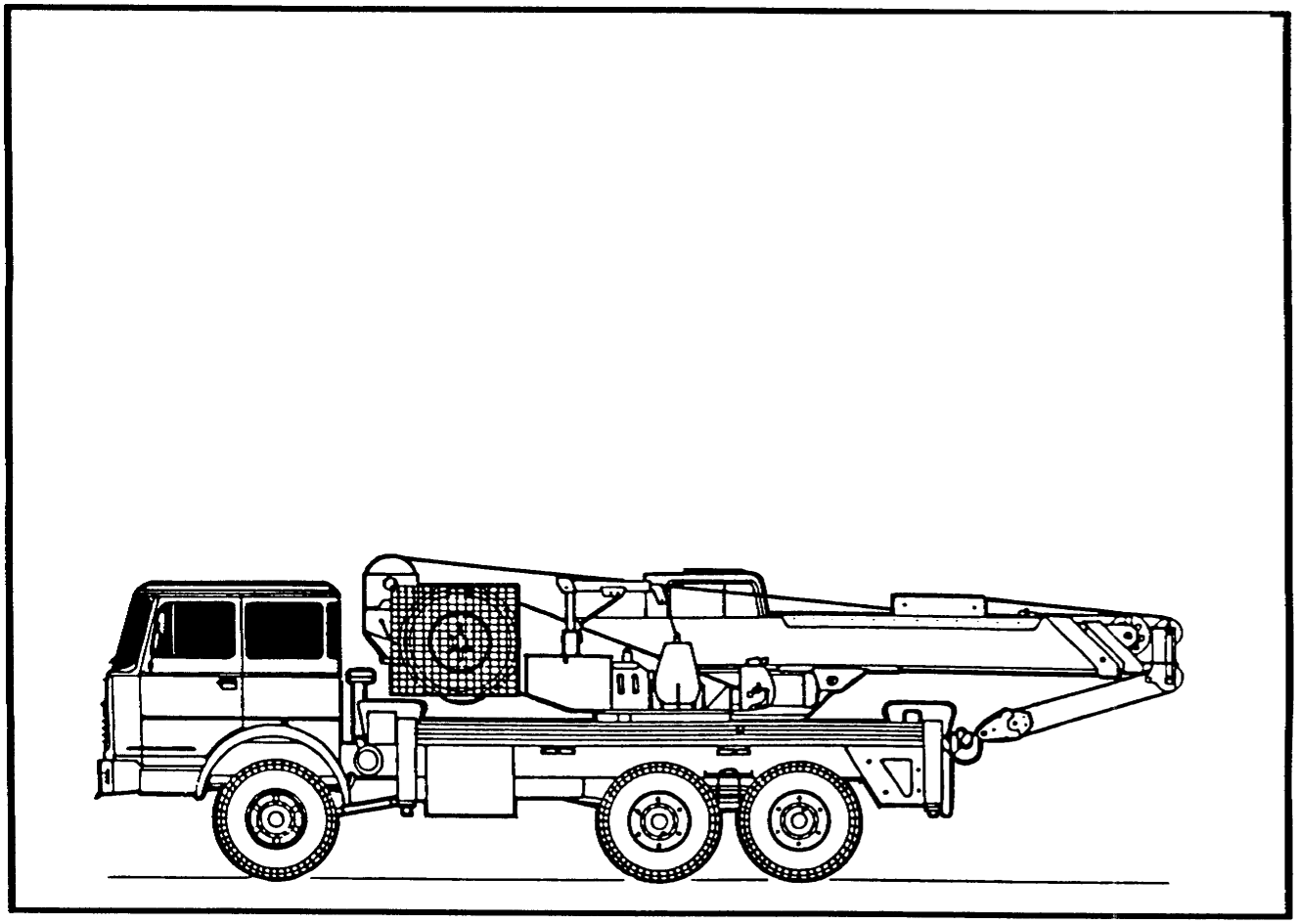


Figure 3-35. 20-Ton Crane Truck Astra BM-20-NR-2.

Characteristics:

10.1 3m long, 2.50m wide.
Truck has cab over engine.
Operator's cabin is at rear.
On third of boom extends past rear.
It has a solid boom.
Vehicle has three axles.

User country: Italy.

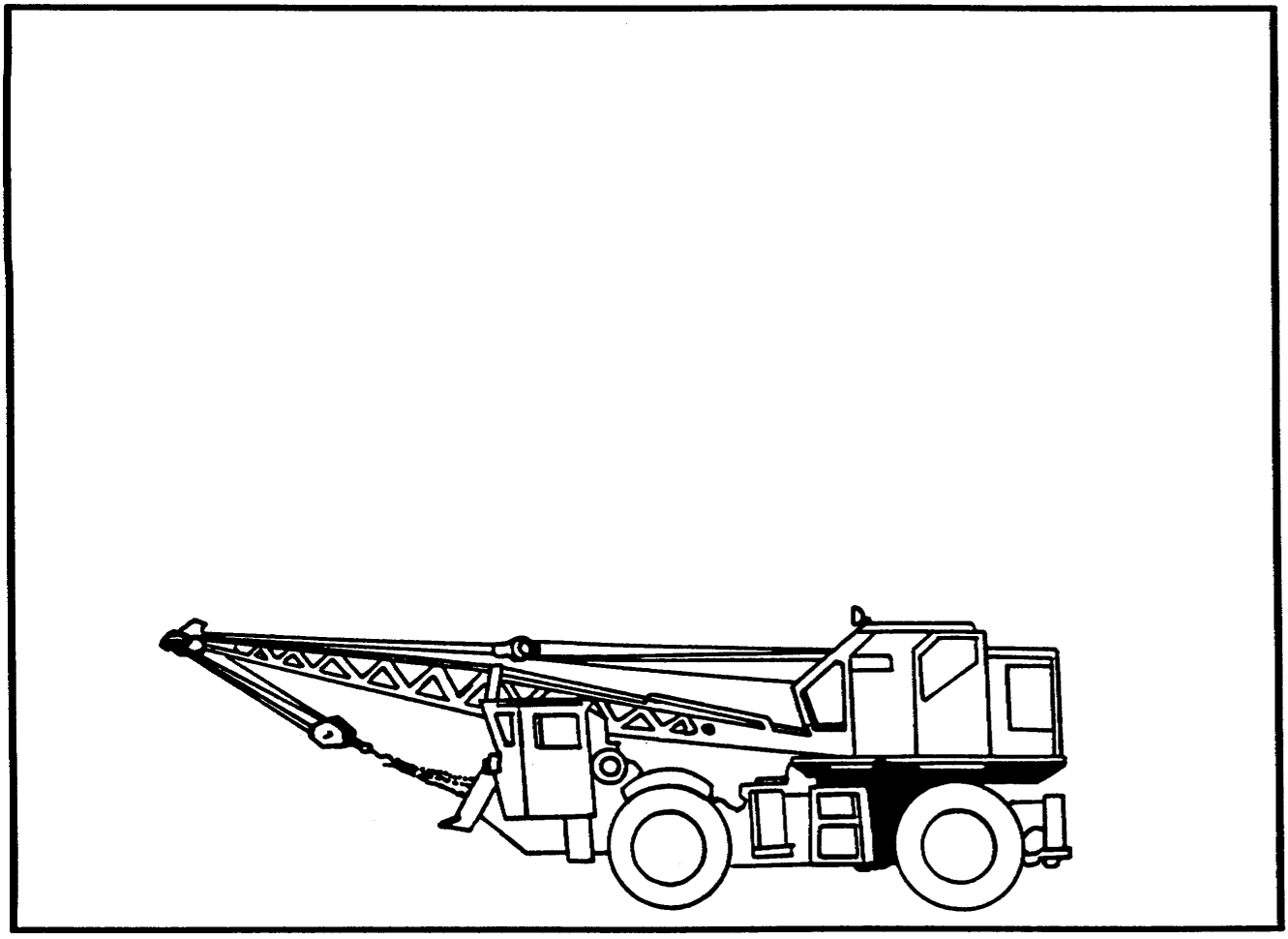


Figure 3-36. 15-Ton Crane M-315T.

Characteristics:

14.27m long with 9.84m boom.
9.10m long without boom, 3.49m wide.
Truck has cab over engine.
Operators cabin is at rear of vehicle.
Half of the boom extends past cab.
Vehicle has two axles.
It has a 15-ton lift capability for lifting and loading.
It may use hook block, dragline, clam, or pile driver attachments.
Engine is beneath cab.
Only a half cab is on the left.

User country: US.

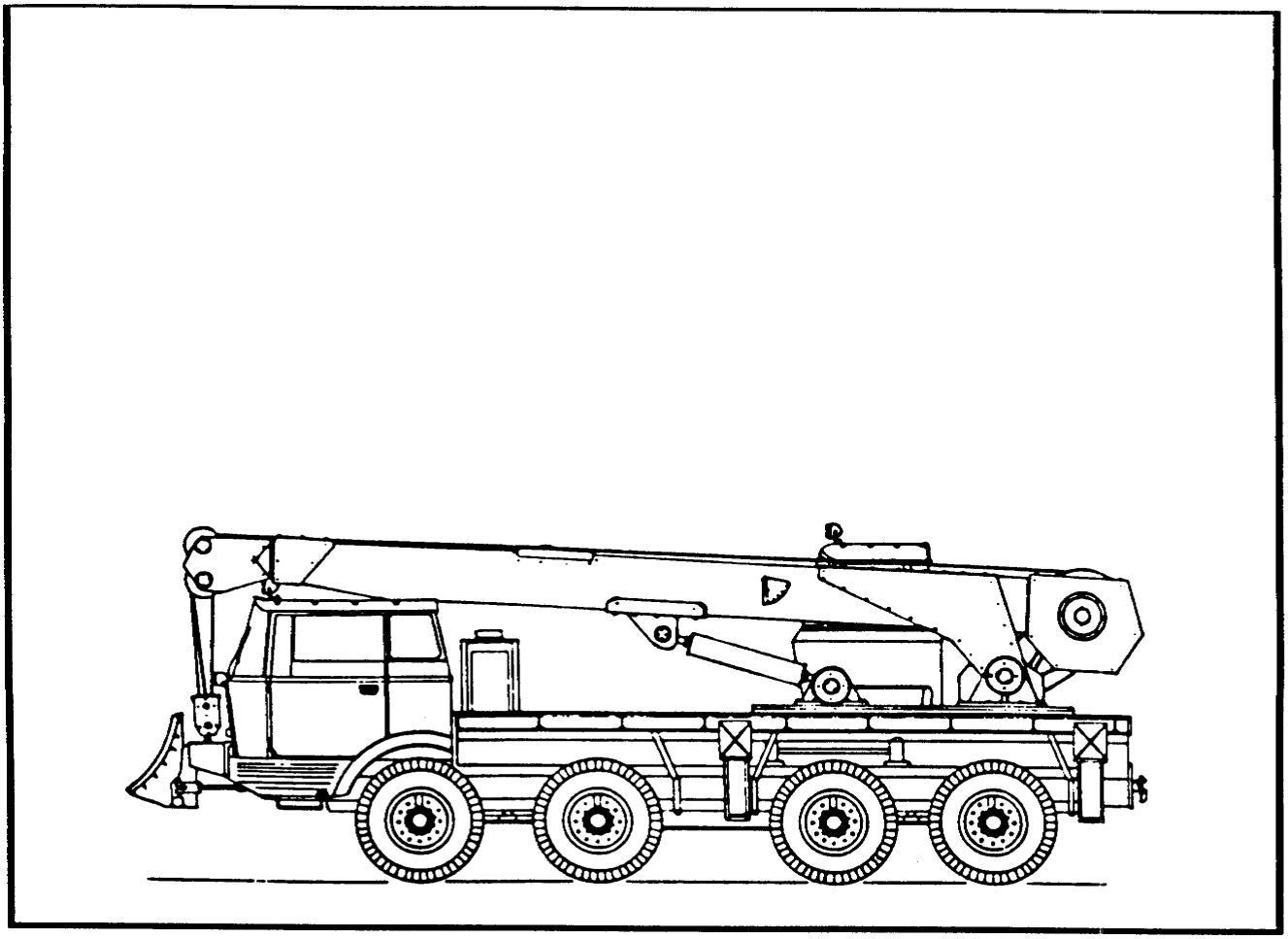


Figure 3-37. Mobile Crane Tatra ZA-T813.

Characteristics:

Measurements are not available.
Truck has cab over engine.
It has no operator's cabin.
Dozer blade is mounted at front.
Crane is mounted on Tatra-813 chassis.
Crane is mounted at rear and barely overhangs front edge of cab.
Vehicle has four axles.

User country: Czech Republic and Slovenia.

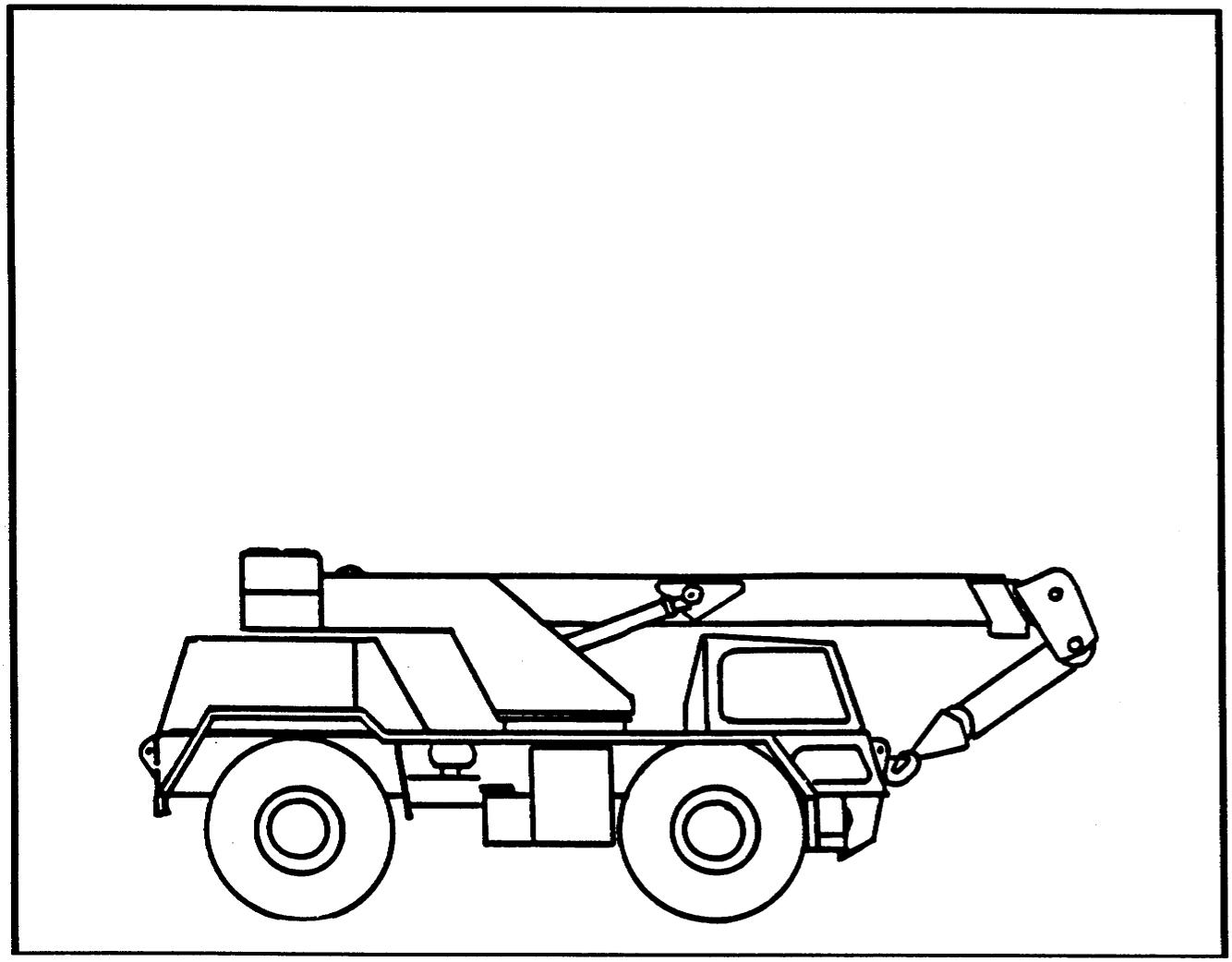


Figure 3-38. Mobile Crane Hydra-Husky 6/8 TC.

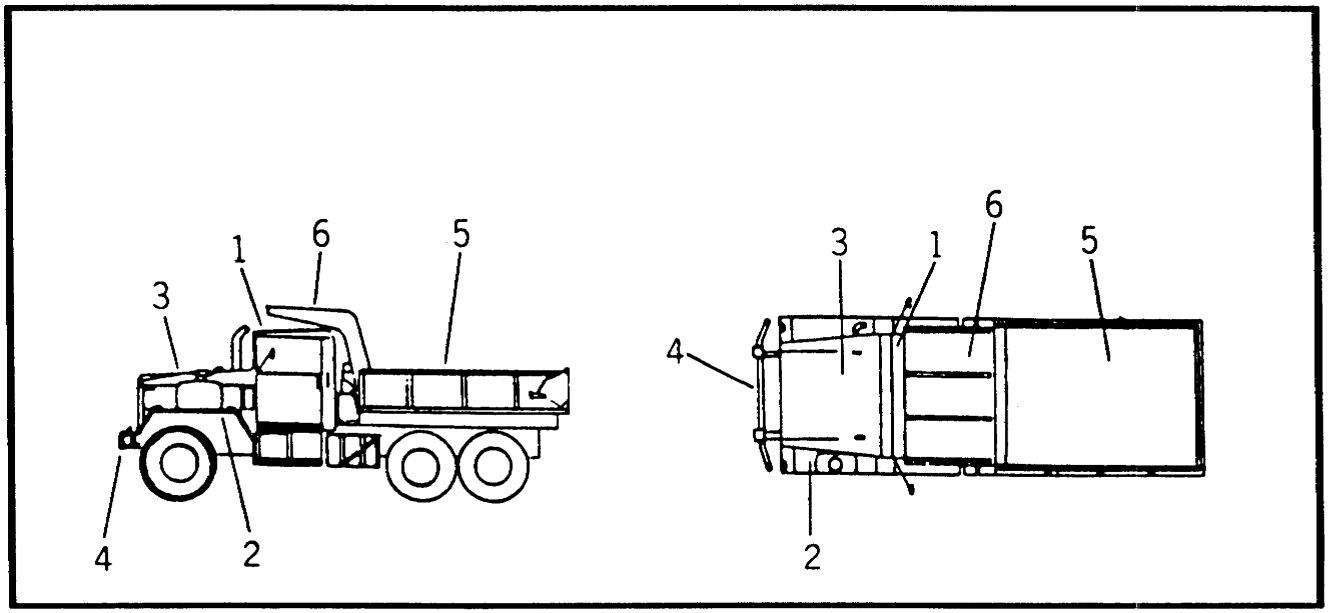
Characteristics:

5.80m long, 2.50m wide.
4 x 4 truck has cab over engine.
No operator's cabin is on crane.
There is no dozer blade or spade mounted.
Boom extends past cab.
Vehicle has two axles.

User country: UK.

PART E: IDENTIFICATION CHARACTERISTICS OF DUMP TRUCKS

1. Dump trucks are heavy-duty trucks having a bed that tilts backward to dump loose materials. Recognition features are shown in Figure 3-39.



Legend:

1 - Cab	4 - Bumper
2 - Fenders	5 - Dumping bed
3 - Hood	6 - Dumping bed extension/rock shield

Figure 3-39. Dump Truck Recognition Features.

2. A few typical dump trucks are shown in the following illustrations.

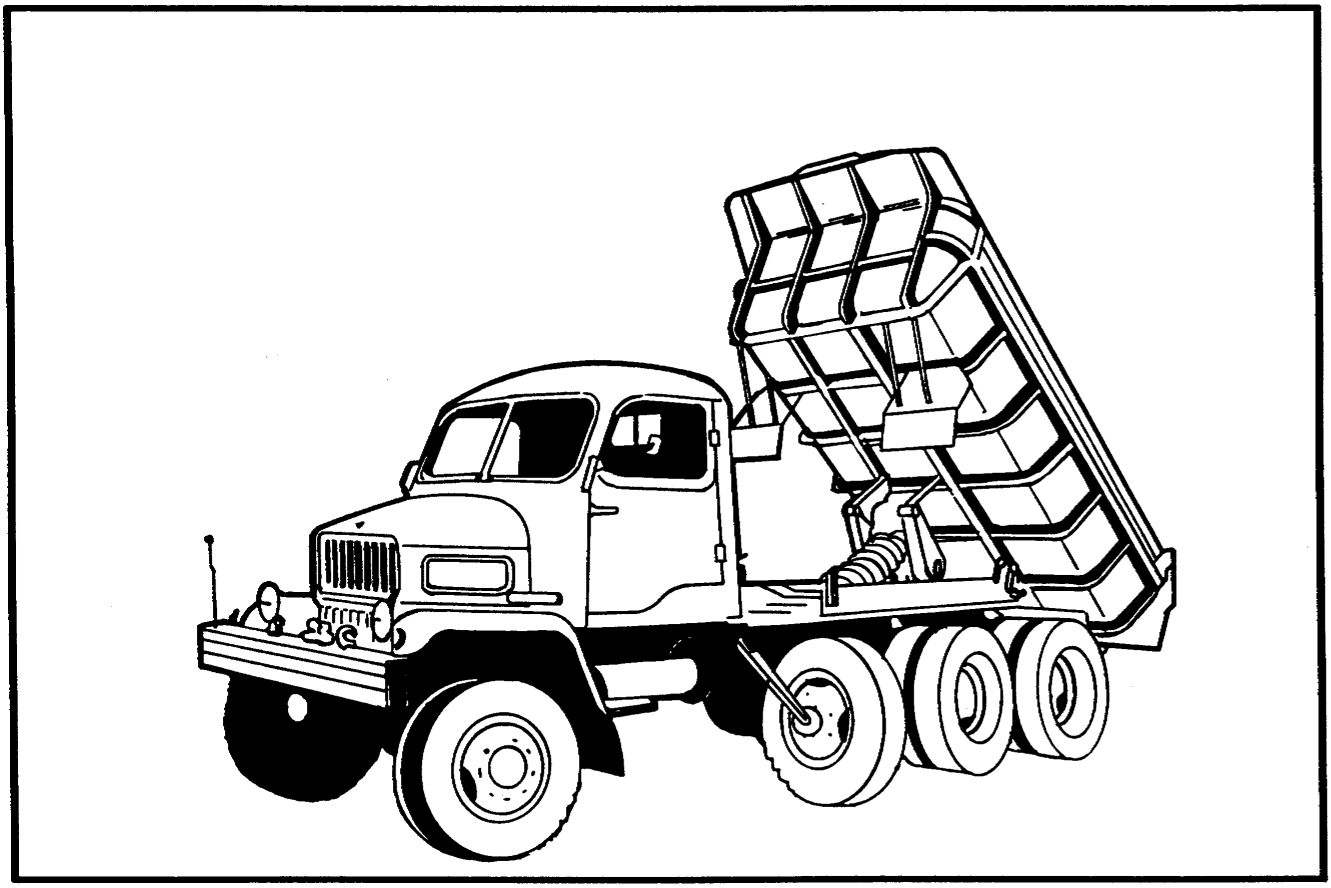


Figure 3-40. Dump Truck Praga-V3S-K.

Characteristics:

6.35m long, 2.24m wide.
Cab is behind engine.
Rock shield/dumping bed extends over cab.
Vehicle has three axles.
Spare tire is behind cab.
It uses rear dumping
Bed is mounted on a Praga-V3S chassis.

User countries: Eastern European countries.

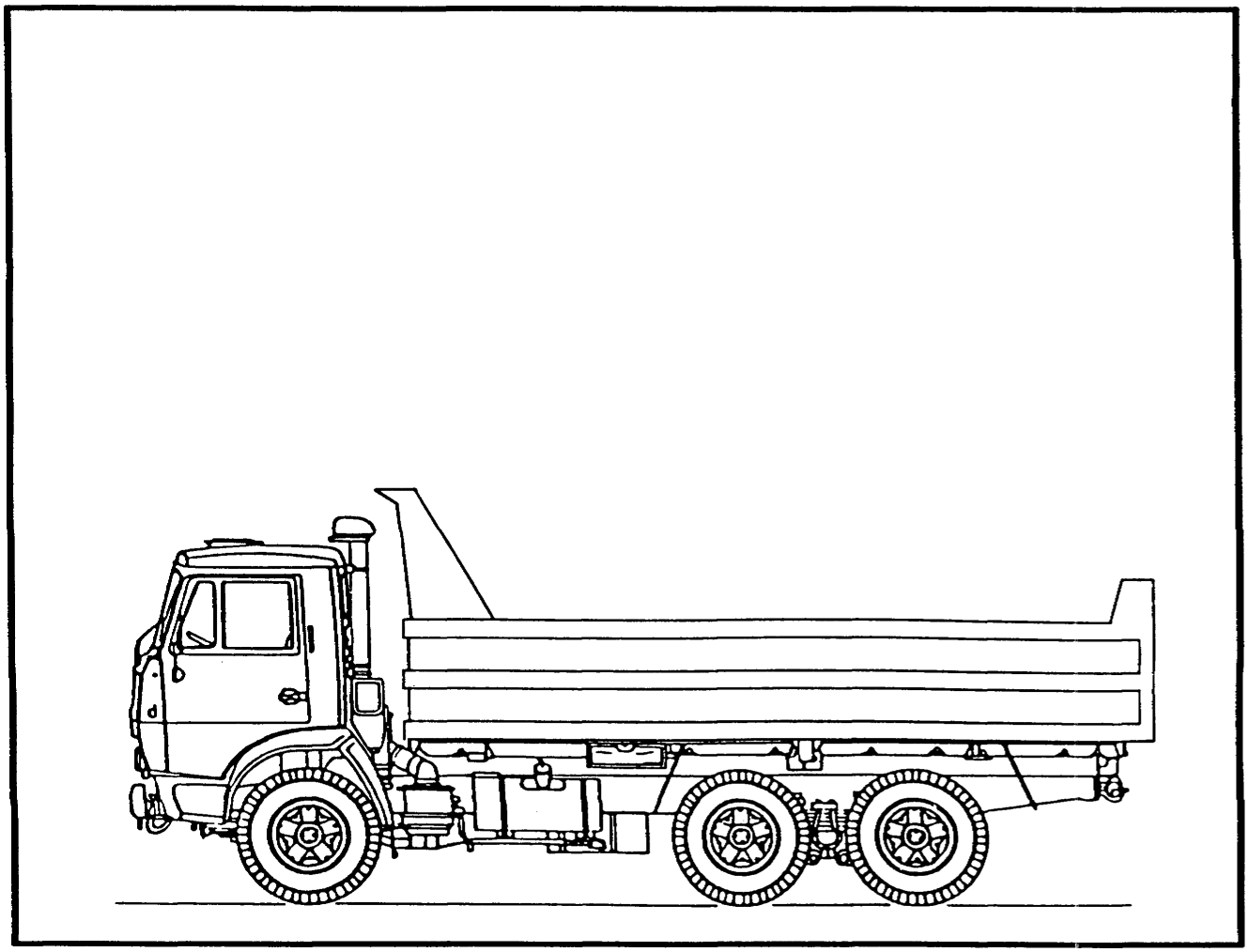


Figure 3-41. Dump Truck KamAZ-5510.

Characteristics:

Measurements are not available.
Cab is over engine.
Rock shield/dumping bed extends over cab.
Air intake above cab roof on left side.
Vehicle has three axles.
It uses rear dumping.
Bed is mounted on a KamAZ-5320 chassis.

User country: CIS.

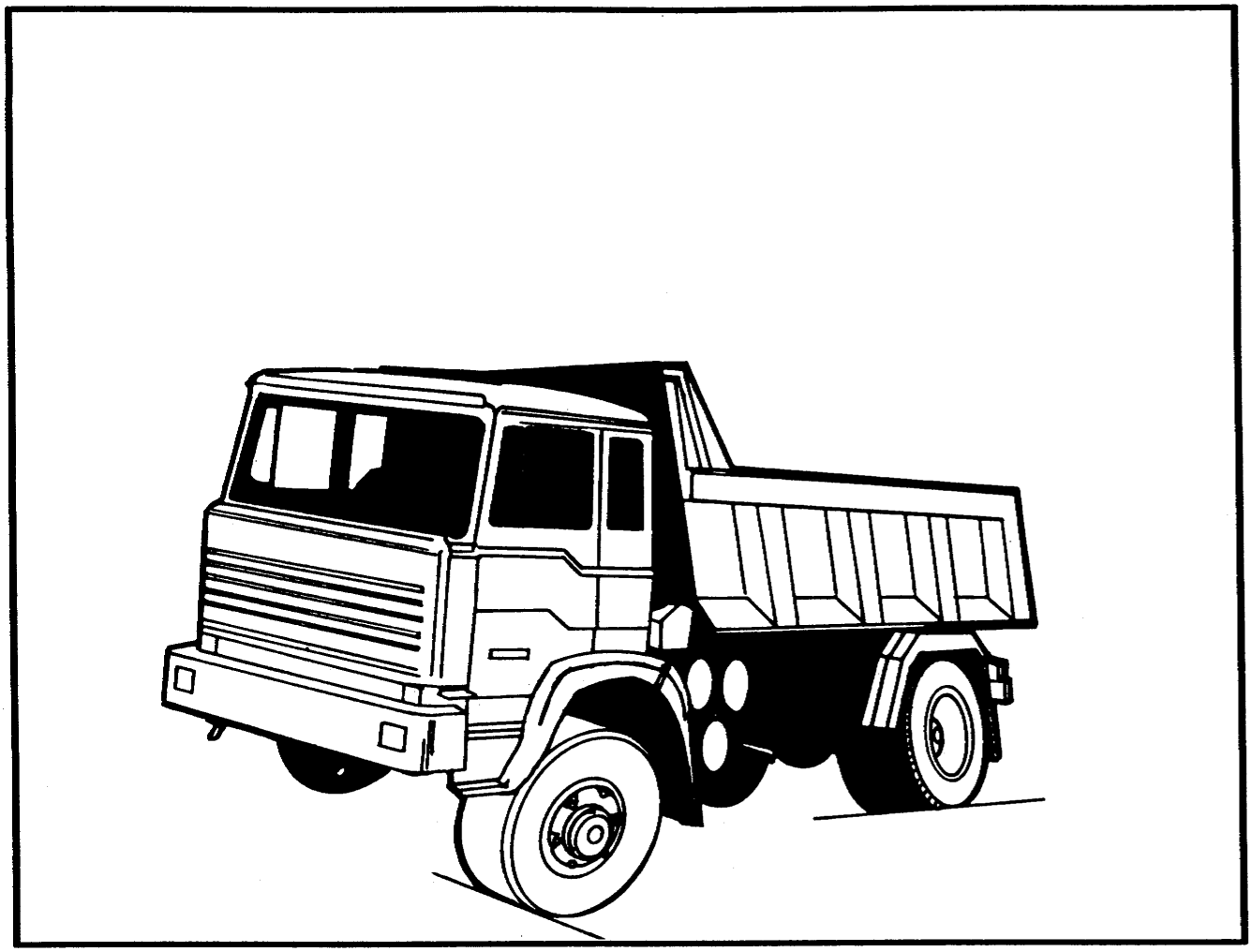


Figure 3-42. Dump Truck Astra-BM-201-MT.

Characteristics:

6.1 m long, 2.49m wide.
Cab is over engine.
Rock shield/dumping bed extends slightly over cab.
Vehicle has two axles.
It uses rear dumping.
Bed is mounted on an Astra chassis.

User country: In production for the Italian Army.

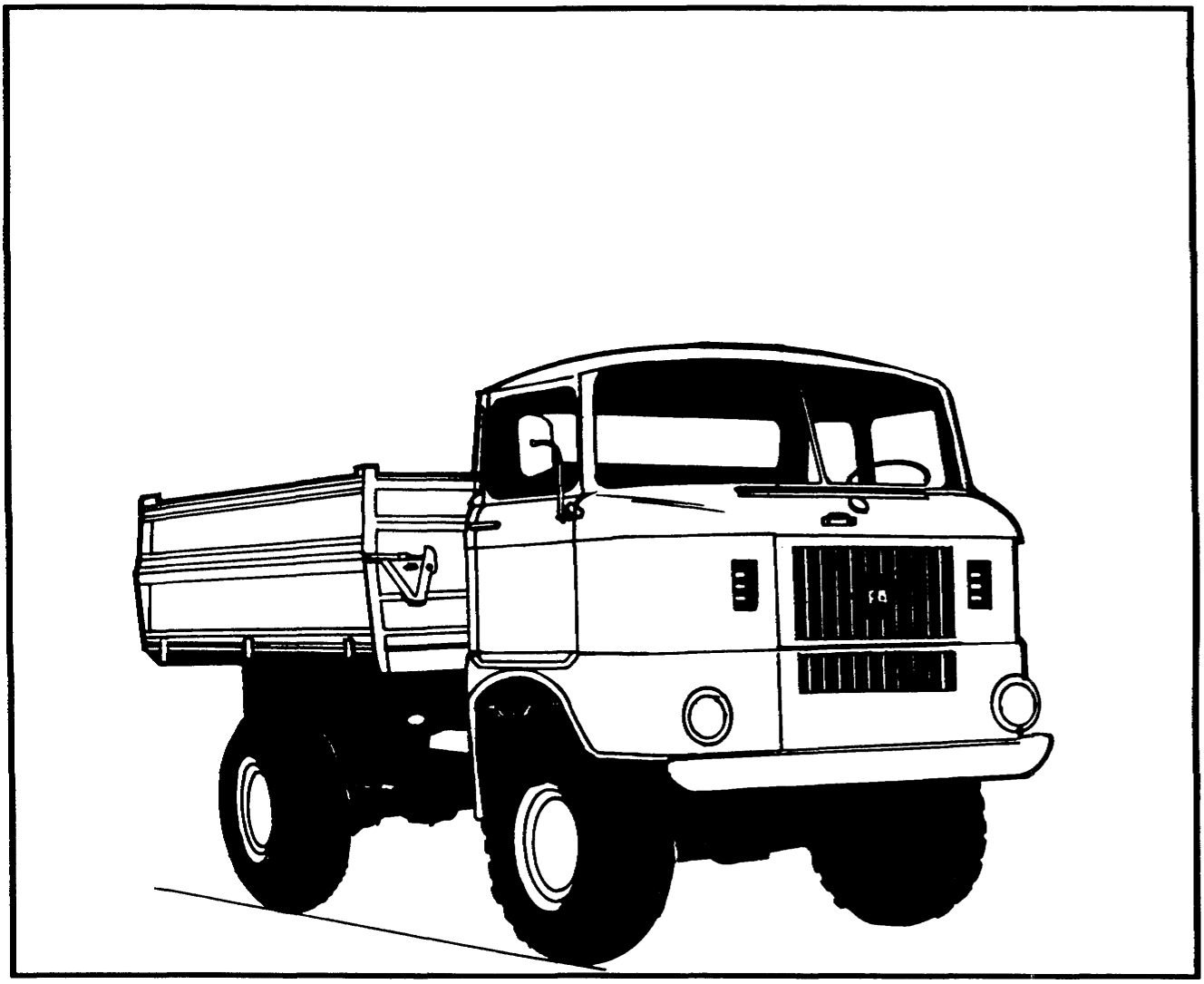


Figure 3-43. Dump Truck W-50-LA/A.

Characteristics:

Measurements are not available.
Cab is over engine with hatch in center.
No rock shield is over cab.
Vehicle has two axles.
It uses side dumping.
Bed is mounted on a 4x4 chassis.

User countries: Egypt and Iraq.

PART F: IDENTIFICATION CHARACTERISTIC OF OTHER CONSTRUCTION EQUIPMENT.

There is other engineer equipment,- such as forklifts, drilling equipment, scrapers, excavators, etc. Some of these are shown in the following illustrations.

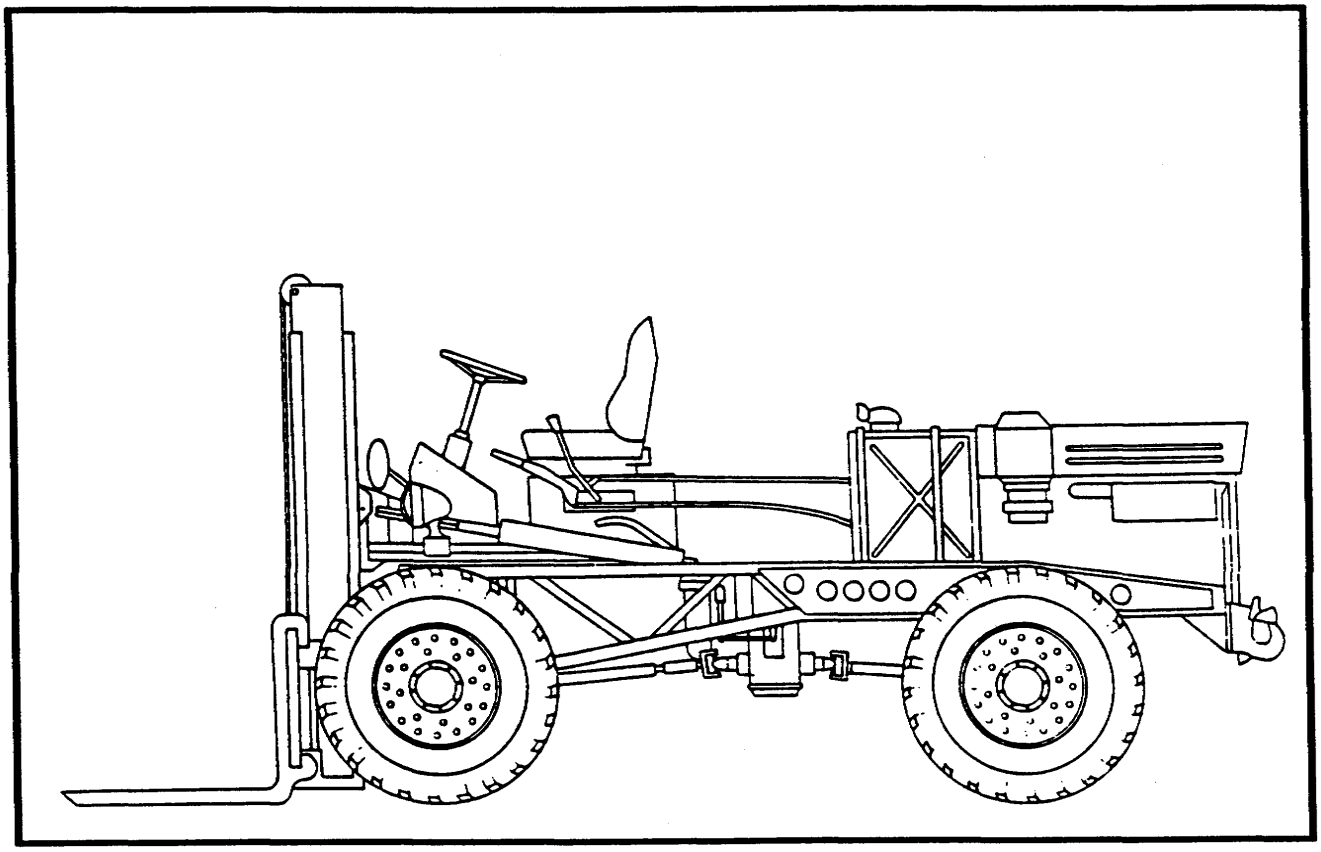


Figure 3-44. Heavy Duty Forklift Eager Beaver.

Characteristics:

5.50m long, 1.85m wide.
Forklift is mounted at front of two-axled tractor.
Engine is at rear.
It is designed for handling loads in difficult terrain.

User country: UK.

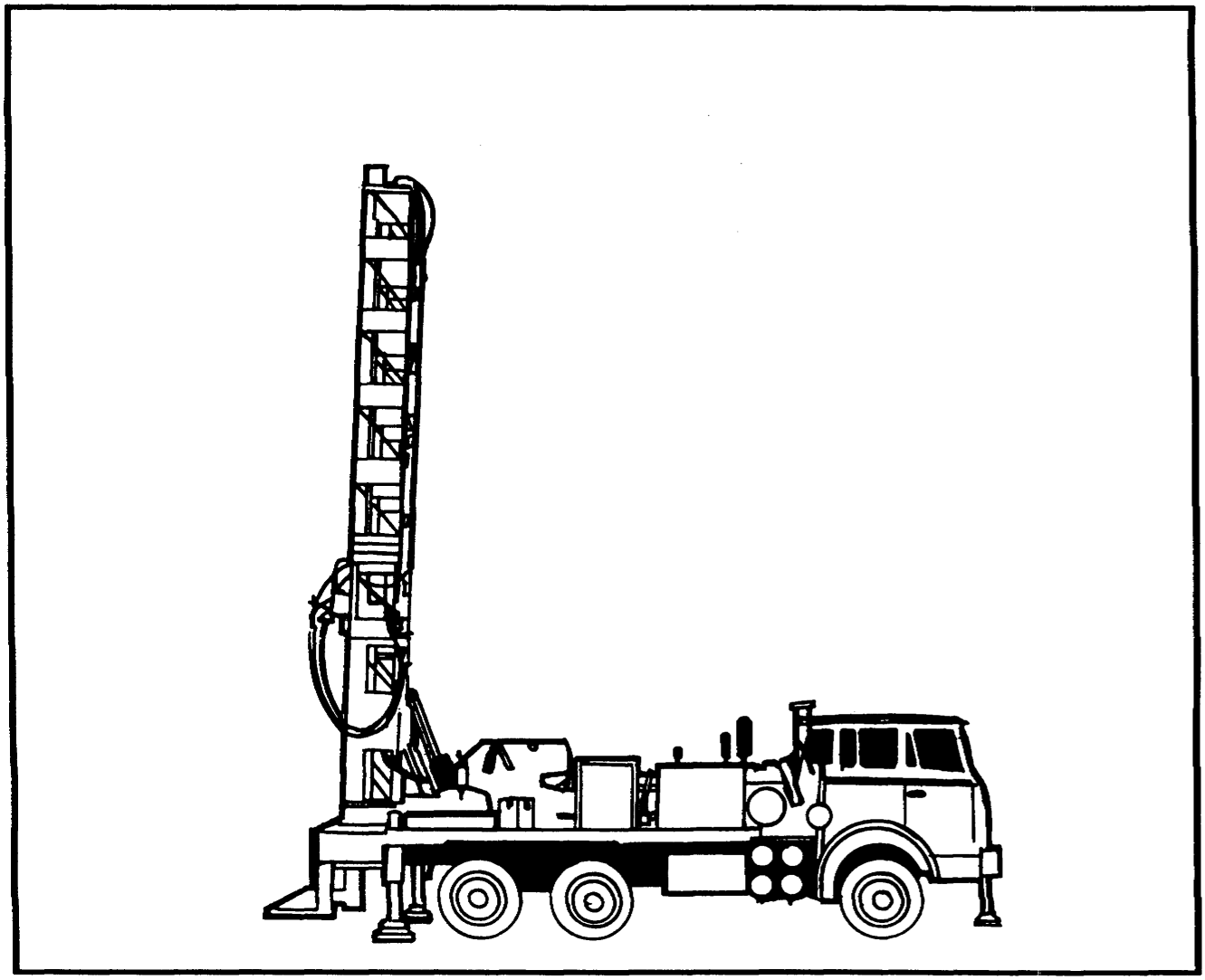


Figure 3-45. Mobile Drilling Equipment Astra-BM-20-MP-1.

Characteristics:

9.30m long, 3.80m wide.
Cab is over engine.
Drilling rig is box type.
Vehicle has three axles.

User country: In production in Italy.

LESSON 3

PRACTICE EXERCISE

The following items will test your grasp of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

1. Which dozer is depicted in Figure 3-46?

   A. Cable operated.

   B. Hydraulic.

   C. Side-Mounted.

   D. Front loader.

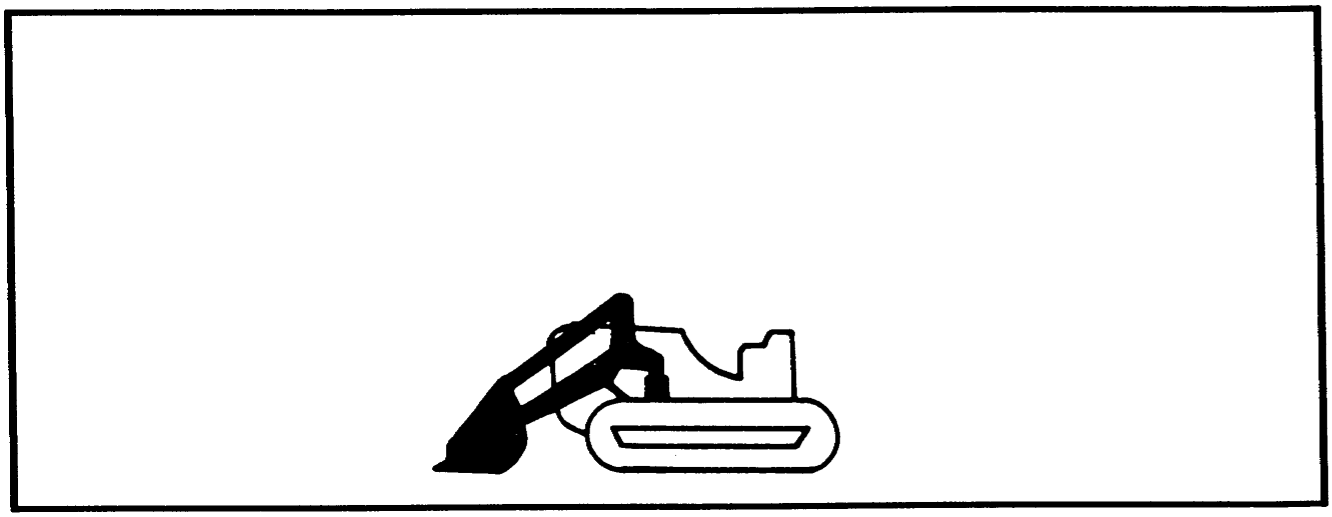


Figure 3-46

2. Which capability is primarily provided by a bulldozer?

   A. Ditching.

   B. Mine clearing.

   C. Earth moving.

   D. Dumping.

3. Which equipment is shown in Figure 3-47?

   A. Motorized scraper.

   B. Scraper.

   C. Excavator.

   D. Mobile digger.

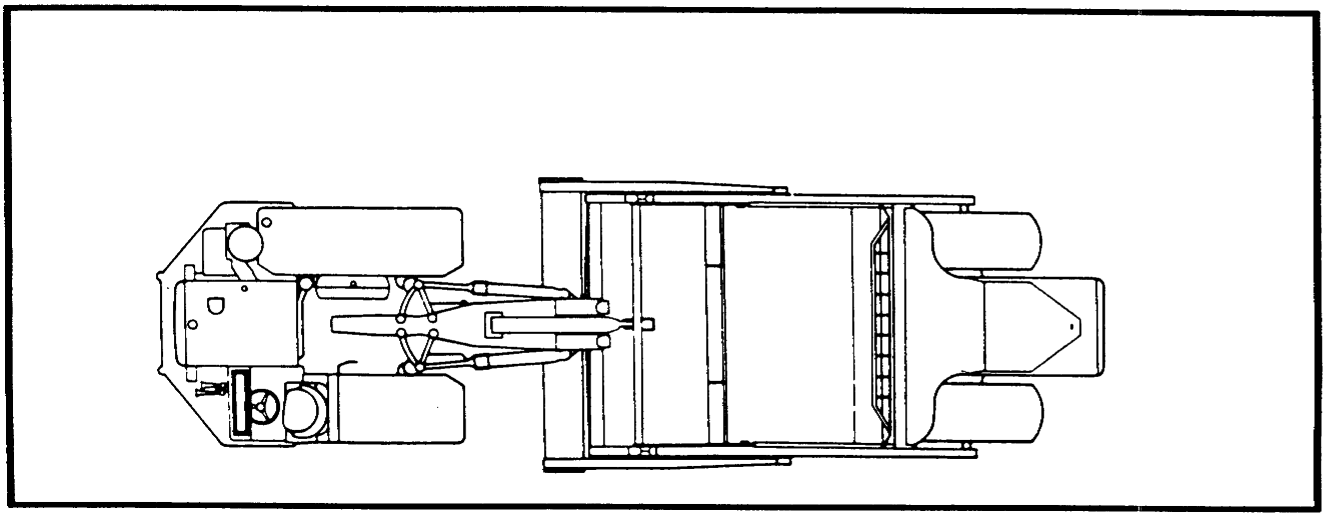


Figure 3-47

4. Which of the following earth movers has a dumping container behind its dozer blade?

   A. BAT-M.

   B. M9.

   C. D-7F.

   D. Allis Chambers 645M.

5. Which crane is depicted in Figure 3-48?

   A. ADK-160.

   B. K-67.

   C. Astra BM-20-NR-2.

   D. Tatra ZA-T813.

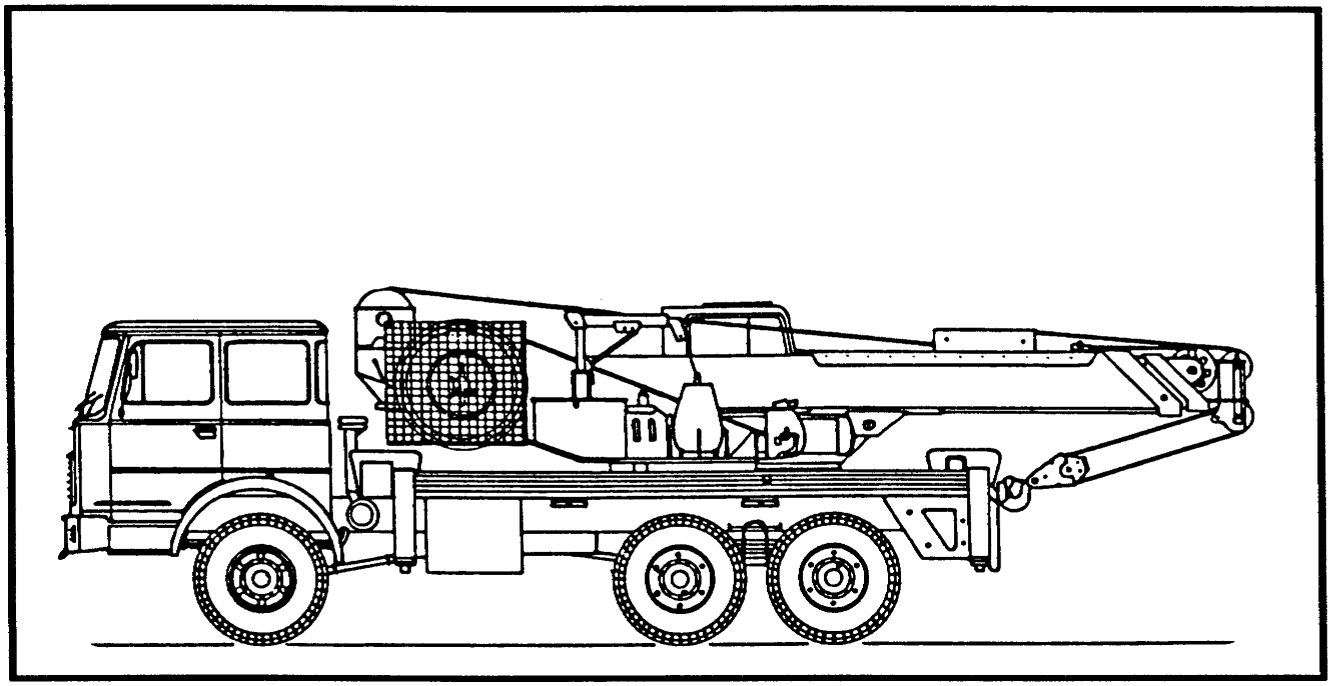


Figure 3-48

6. What is a major difference in identifying a Smith L2825 and a BM-20-NR-2?

   A. The Smith L2825 has a lattice boom.

   B. The BM-20-NR-2 has a lattice boom.

   C. The Smith L2825 has four axles.

   D. The BM-20-NR-2 has no operators cabin.

LESSON 3

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

Item	Correct Answer and Feedback
1.	D. This is a front loader (page 3-4, fig 3-2).
2.	C. A bulldozer is primarily used for earth moving operations (page 3-8, para 1).
3.	A. This is a motorized scraper Caterpillar 621 (page 3-25, fig 3-23).
4.	B. The armored combat earth mover M9 has a dumping container behind its dozer blade (page 3-11, fig 3-9).
5.	C. This is a 20-Ton crane truck Astra BM-20-NR-2 (page 3-38, fig 3-35).
6.	A. The Smith L2825 has a lattice boom (page 3-37, para 1/fig 3-34).

LESSON 4

IDENTIFY DECONTAMINATION EQUIPMENT ON AERIAL IMAGERY

Critical Tasks: 301-338-1808
301-338-3701

OVERVIEW

TASK DESCRIPTION:

In this lesson you will learn to identify decontamination equipment on aerial imagery using imagery analysis techniques and procedures.

LEARNING OBJECTIVES:

ACTIONS: Use the elimination process to identify decontamination equipment on aerial imagery.

CONDITION: You will be given extracts from FM 3-87, FM 100-2-3, STP 34-96D1 -SM, USAREUR Pam 30-60-1, and Jane's Military Vehicles and Ground Support Equipment.

STANDARD: You will identify decontamination equipment IAW FM 3-87, FM 100-2-3, STP 34-96D1-SM, STP 34-96D24-SM-TG, USAREUR Pam 30-60-1, and Jane's Military Vehicles and Ground Support Equipment.

References: FM 3-87
FM 100-2-3
STP 34-96D1-SM
STP 34-96D24-SM-TG
USAREUR Pam 30-60-1
Jane's Military Vehicles and Ground Support Equipment.

INTRODUCTION

If nuclear, biological, or chemical (NBC) weapons are used, many units and large amounts of terrain can become contaminated in a short period of time. Survival in this environment depends on quick identification of contaminated areas and units and the ability of individual soldiers to protect themselves against NBC contamination until some form of decontamination is possible.

Decontamination units use truck-mounted tank, pump, and water heater units and trailer-mounted pump and water heater units to conduct personnel and equipment decontamination operations.

PART A: DECONTAMINATION OPERATIONS

1. USSR strategy relies on the introduction of large amounts of mass destruction weapons, to include the use of NBC weapons. The residual contamination effects of NBC weapons produce a hazard to both friendly and enemy forces. To combat this, decontamination centers must be set up. Siting an enemy decontamination center would be highly indicative of the enemy's plan to use NBC weapons.

2. Decontamination centers are easily identified by:

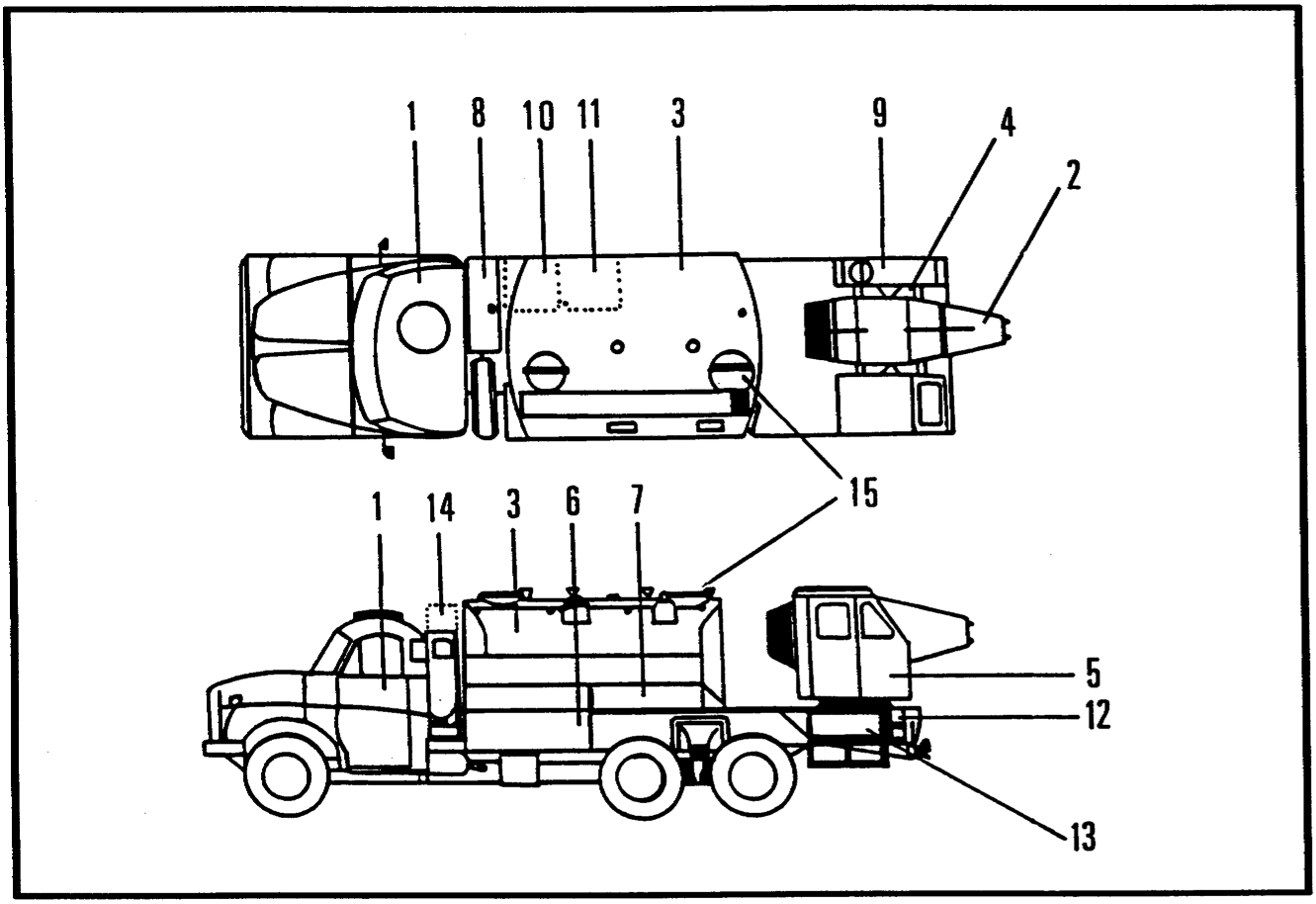
- The presence of tents
- A plentiful water source
- Key pieces of equipment.

3. If a lake, pond, river, or dam is not available then large collapsible water storage tanks are used and resupplied by tank trucks. Decontamination units use truck or trailer-mounted tanks, pumps, and water heater units.

REMEMBER: A water source must be available to accommodate any decontamination operation.

PART B: IDENTIFICATION CHARACTERISTICS OF DECONTAMINATION EQUIPMENT

1. Recognition Features. Figure 4-1 provides an illustration of the recognition features of decontamination equipment.



LEGEND:

1. Basic Tatra-148 chassis
2. Turbine
3. Decontaminate tanks
4. Turntable
5. Operator's cabin
6. Hydraulics compartment
7. Water heater
8. Heater fuel tank
9. Smoke screen equipment
10. Hydraulic fuel reservoir
11. Fuel tank
12. Jerri can
13. Vehicle service hatch
14. Camouflage net stowage
15. Access hatch

Figure 4-1. Recognition Features of Truck-Mounted Decontamination Apparatus.

2. Identification aids. Identification of decontamination equipment is very basic. Most decontamination vehicles consist of a large tank with many accessories, such as extra nozzles, hoses, and racks. The TMS-65 (Figure 4-5) and TZ-74 (Figure 4-9) also have gas turbines mounted on the rear.

3. Identification hazards. Since most decontamination vehicles mount a tank, they could be mistaken for a water or POL truck.

4. Radiological-chemical reconnaissance vehicles. The Warsaw Pact armies employ specialized radiological-chemical reconnaissance versions of the standard UAZ-69, BRDM, BRDM-2, and FUG-65 (OT-65) vehicles to locate and mark radiologically and chemically contaminated areas. The designator for these vehicles is "rkh", for example, UAZ-69rkh, BRDM-2rkh (Figure 4-2). The vehicles carry two long boxes on each side on the rear of the vehicle. These carry flag emplacers which fire the flags individually. This allows a reconnaissance vehicle crew to rapidly survey and mark a contaminated area without disembarking from the vehicle. Each chemical defense battalion has 9 x BRDM/BRDM-2 assigned.

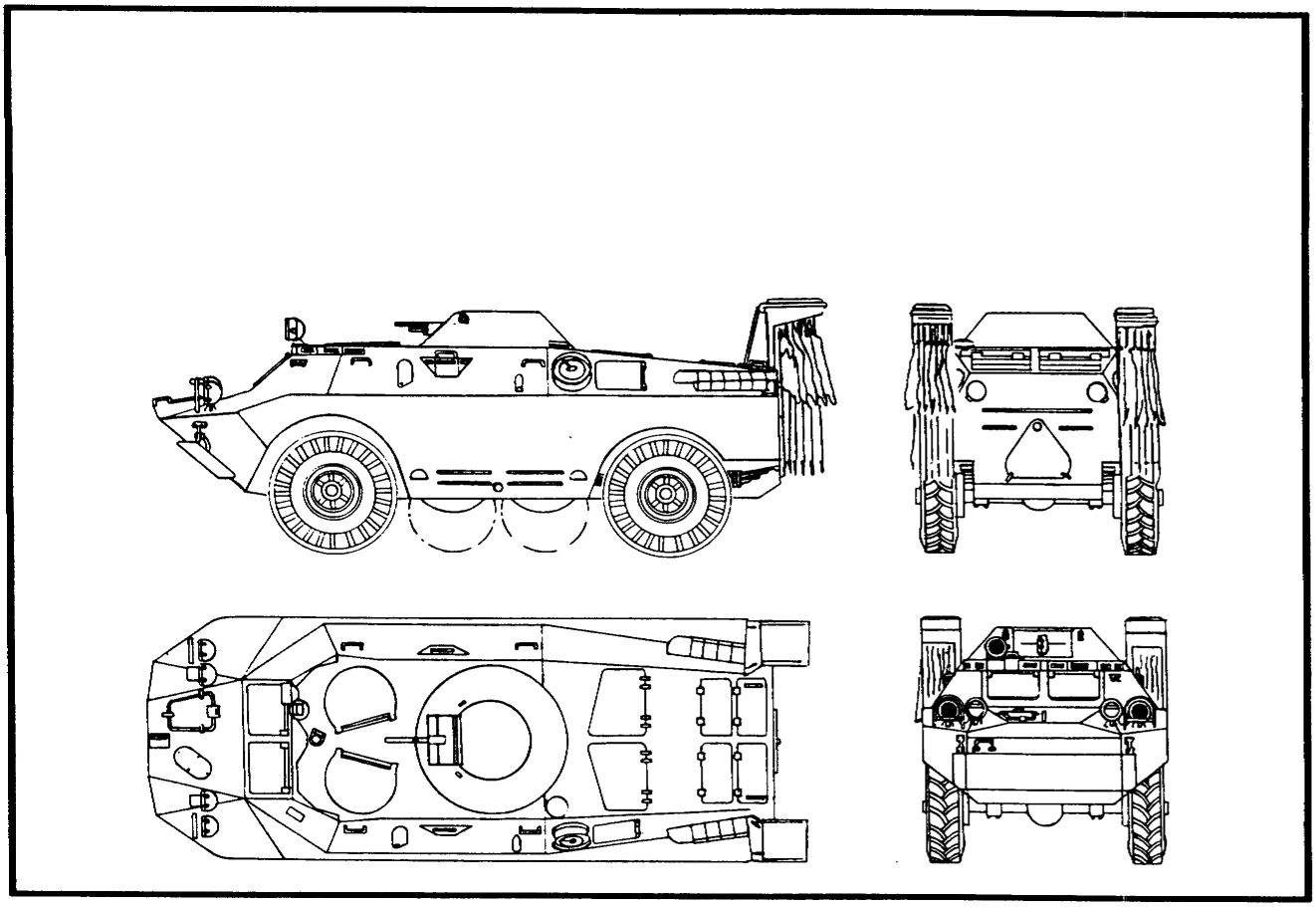


Figure 4-2. BRDM-2rkh.

5. The following dichotomous-type elimination key is of selected world decontamination equipment. Use it as a guide for this lesson only.

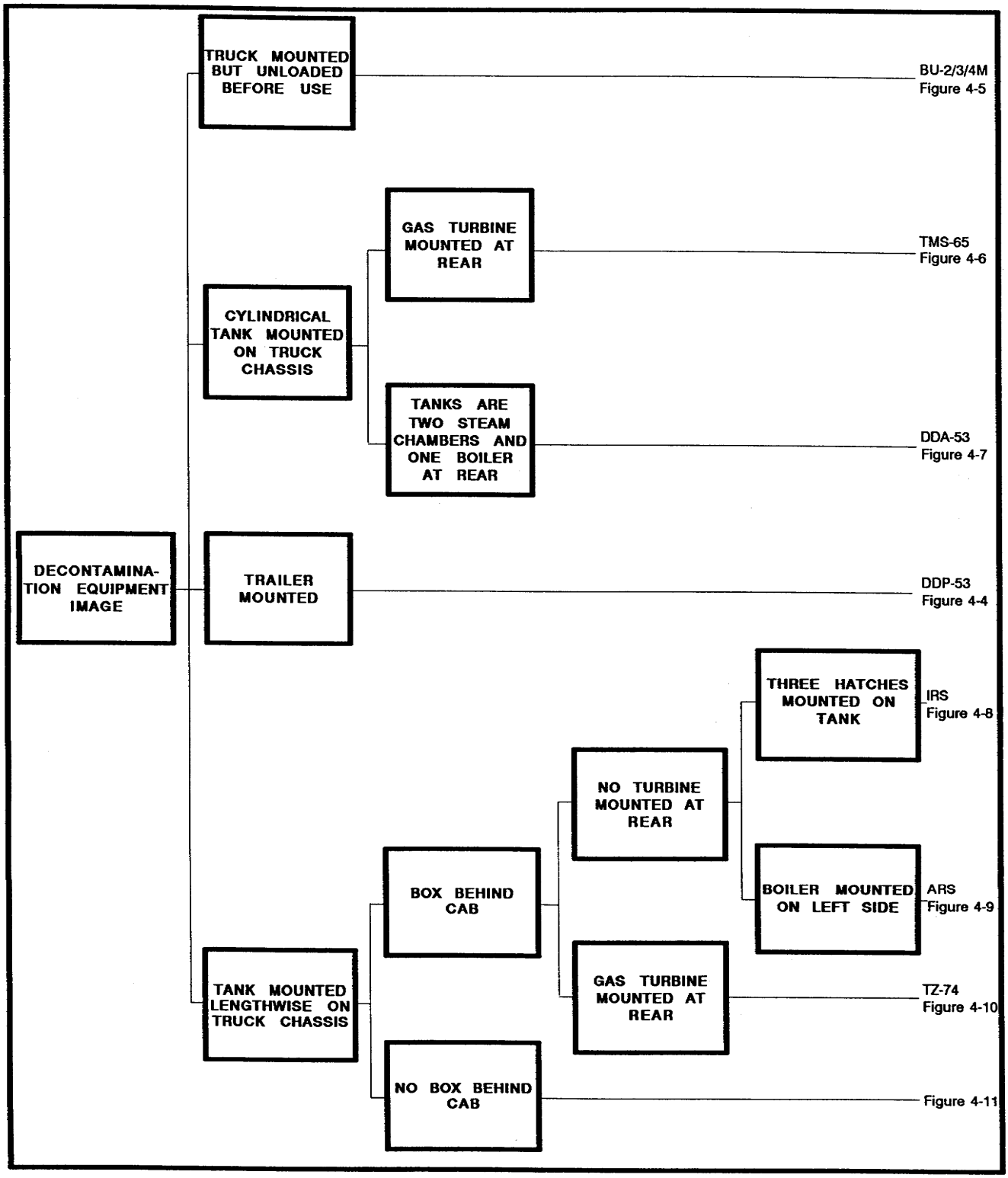

DECONTAMINATION EQUIPMENT IMAGE
TRUCK MOUNTED BUT UNLOADED BEFORE USE
BU-2/3/4M Figure 4-5
CYLINDRICAL TANK MOUNTED ON TRUCK CHASSIS
GAS TURBINE MOUNTED AT REAR
TMS-65 Figure 4-6
TANKS ARE TWO STEAM CHAMBERS AND ONE BOILER AT REAR
DDA-53 Figure 4-7
TRAILER MOUNTED
DDP-53 Figure 4-4
TANK MOUNTED LENGTHWISE ON TRUCK CHASSIS
BOX BEHIND CAB
NO TURBINE MOUNTED AT REAR
THREE HATCHES MOUNTED ON TANK
IRS Figure 4-8
BOILER MOUNTED ON LEFT SIDE
ARS Figure 4-9
GAS TURBINE MOUNTED AT REAR
TZ-74 Figure 4-10
NO BOX BEHIND CAB
Figure 4-11

Figure 4-3.

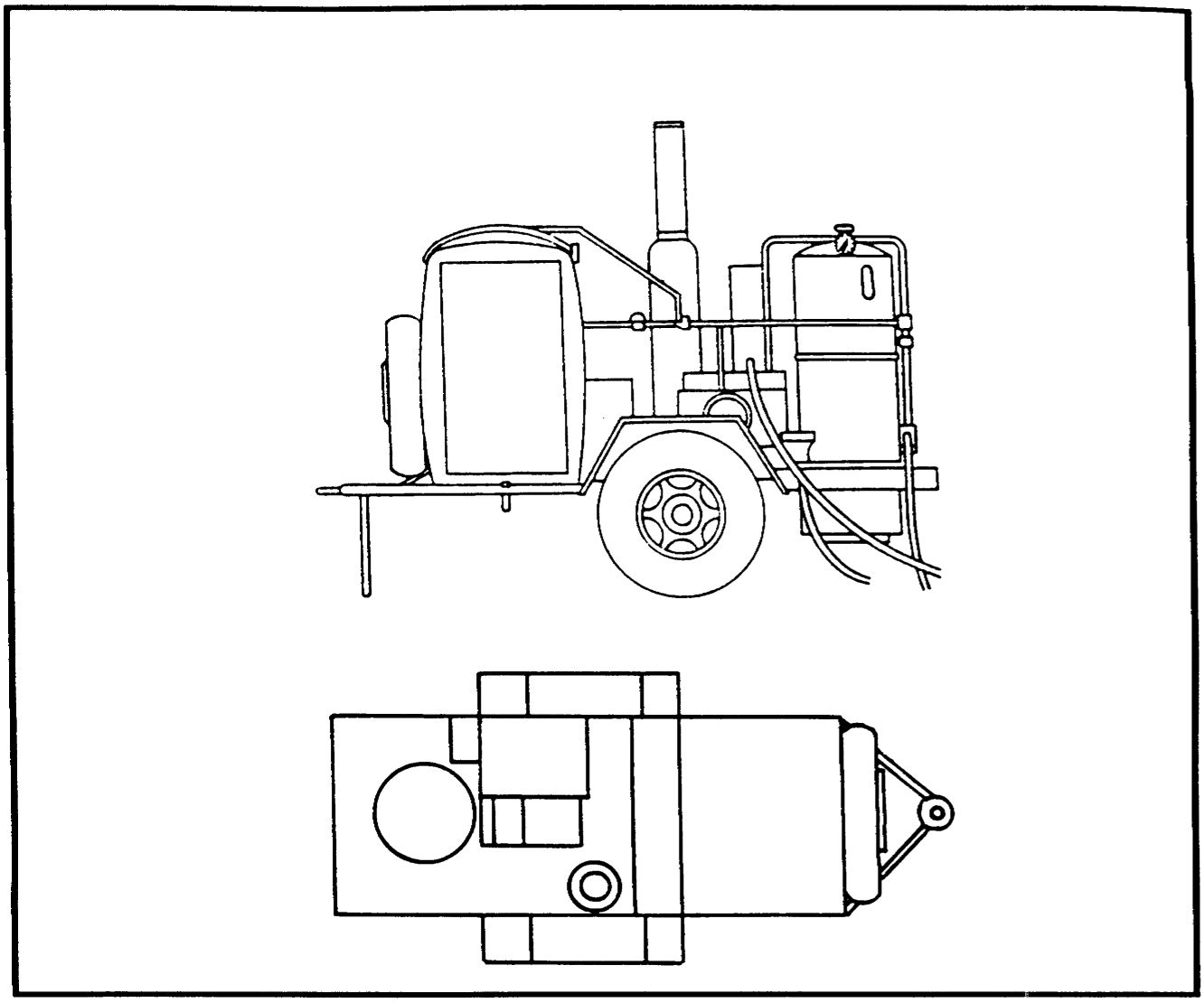


Figure 4-4. Decontamination Apparatus DDP.

Characteristics:

3.77m long, 2.00m wide.
One boiler and one steam chamber are mounted upright on a single axle trailer.
Spare tire is carried at front, on side of steam chamber.
Trailer has flat, angled fenders.

User countries: CIS and Eastern European countries.

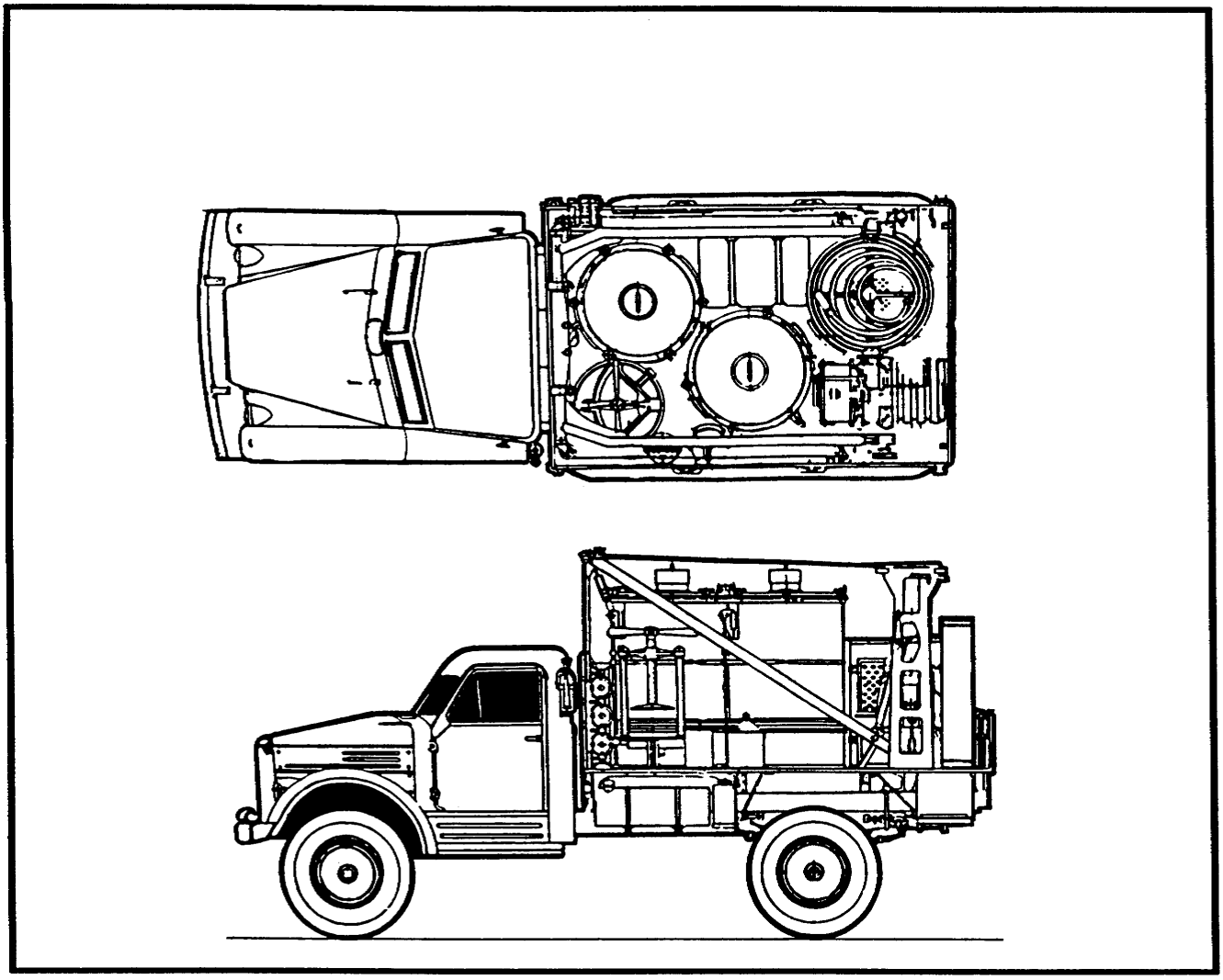


Figure 4-5. Decontamination Apparatus BU-2, BU-3, BU-4, and BU-4M.

Characteristics:
Measurements are not available.
Tanks are upright and usually covered by canvas.
Equipment is carried on truck but unloaded before use.
Equipment is carried on either GAZ-53, GAZ-63, or LO-1800 trucks.
Equipment consists of two boilers, water tank(s), and a drying tent.
It is used for drying uniforms.

User countries: CIS and Eastern European countries.

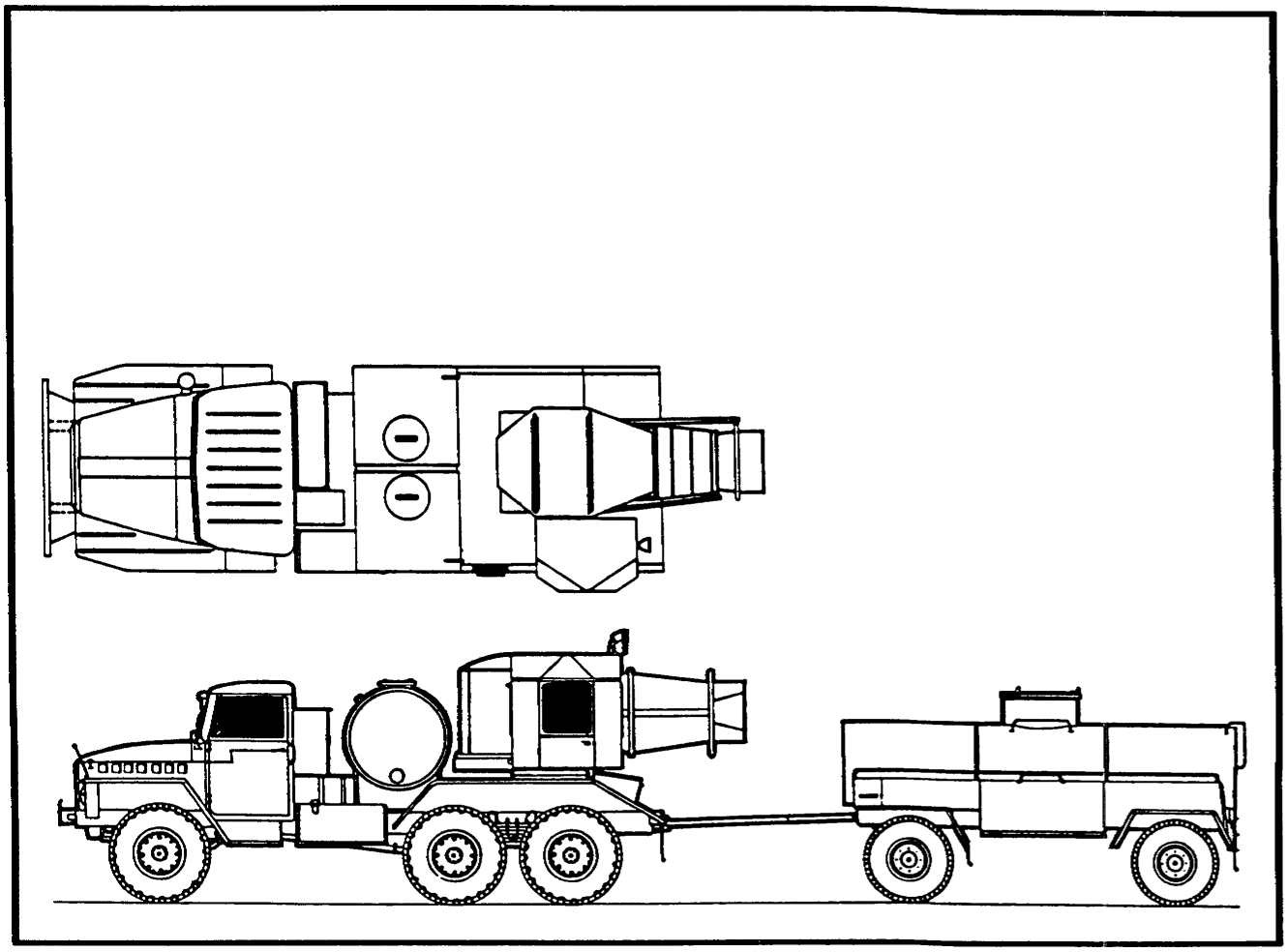


Figure 4-6. Decontamination Apparatus TMS-65.

Characteristics:

7.35m long, 2.69m wide.
Cylindrical tank is mounted behind cab across chassis of Ural-375E truck.
Gas turbine usually covered by canvas is mounted at rear on turntable.
Truck often tows a tank trailer of 4,000 liter capacity.
It is used for rapid decontamination of the exterior of vehicles and towed weapons.
The TMS-65 is normally employed in pairs and it is assigned to the chemical defense battalion.

User countries: CIS and Eastern European countries.

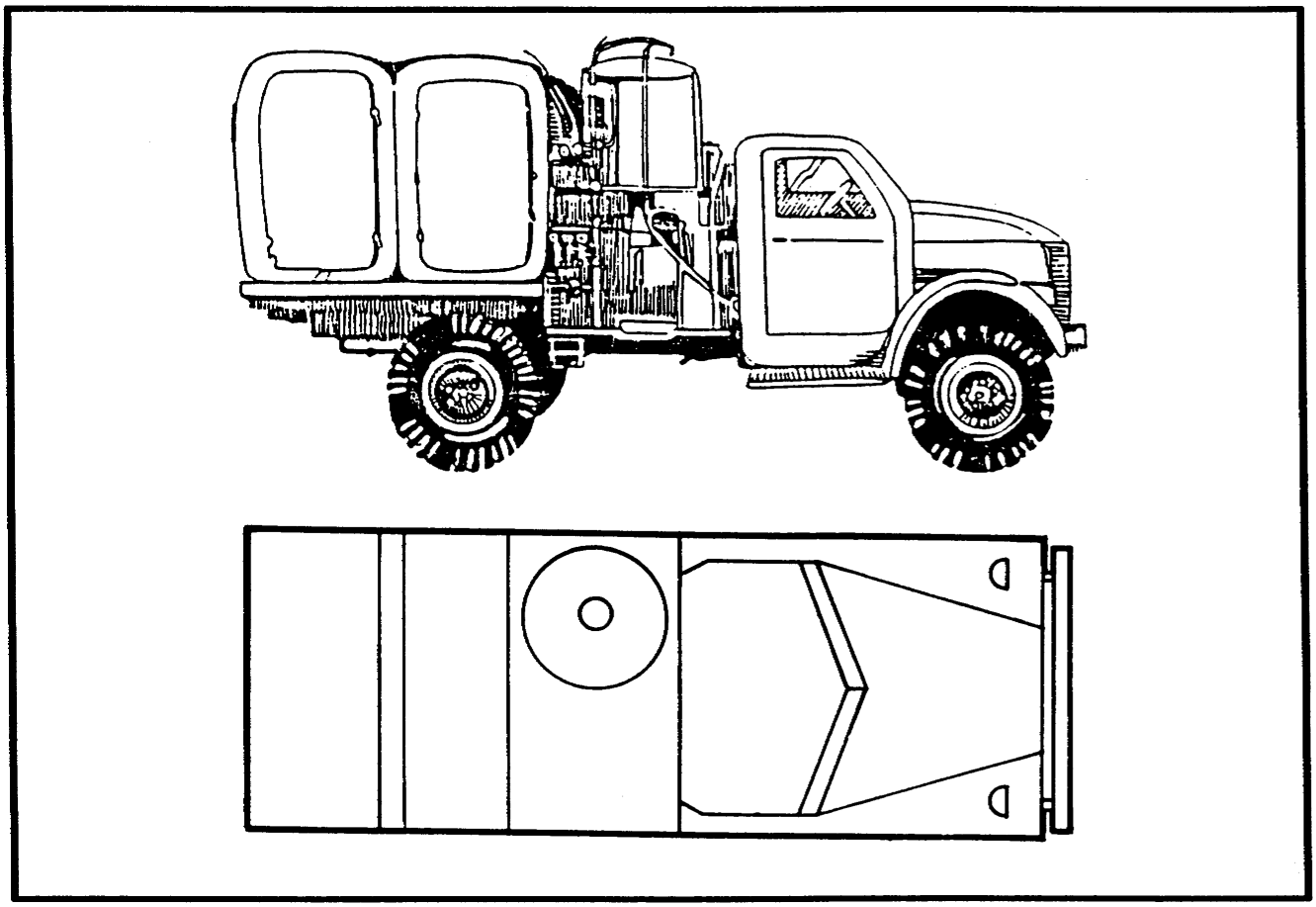


Figure 4-7. Decontamination Apparatus DDA-53.

Characteristics:

5.80m long, 2.25m wide.
Two steam chambers and a boiler are mounted at the rear across chassis (appear as cylindrical tanks) of GAZ-63 truck.
It is used for decontaminating clothing, small arms, and light equipment.
Water must be transported separately.
It is primarily found in chemical defense units.
It is also used in medical units for sterilization, disinfection, and disinfestations.
There are 4 x DDA-53/66 assigned to a CIS NBC chemical defense battalion.

Variants: DD-66: Contains a single steam chamber and is mounted on a GAZ-66 truck.
DDA-2: Contains two steam chambers and is mounted on a ZIL-130 truck.

User countries: CIS and Eastern European countries.

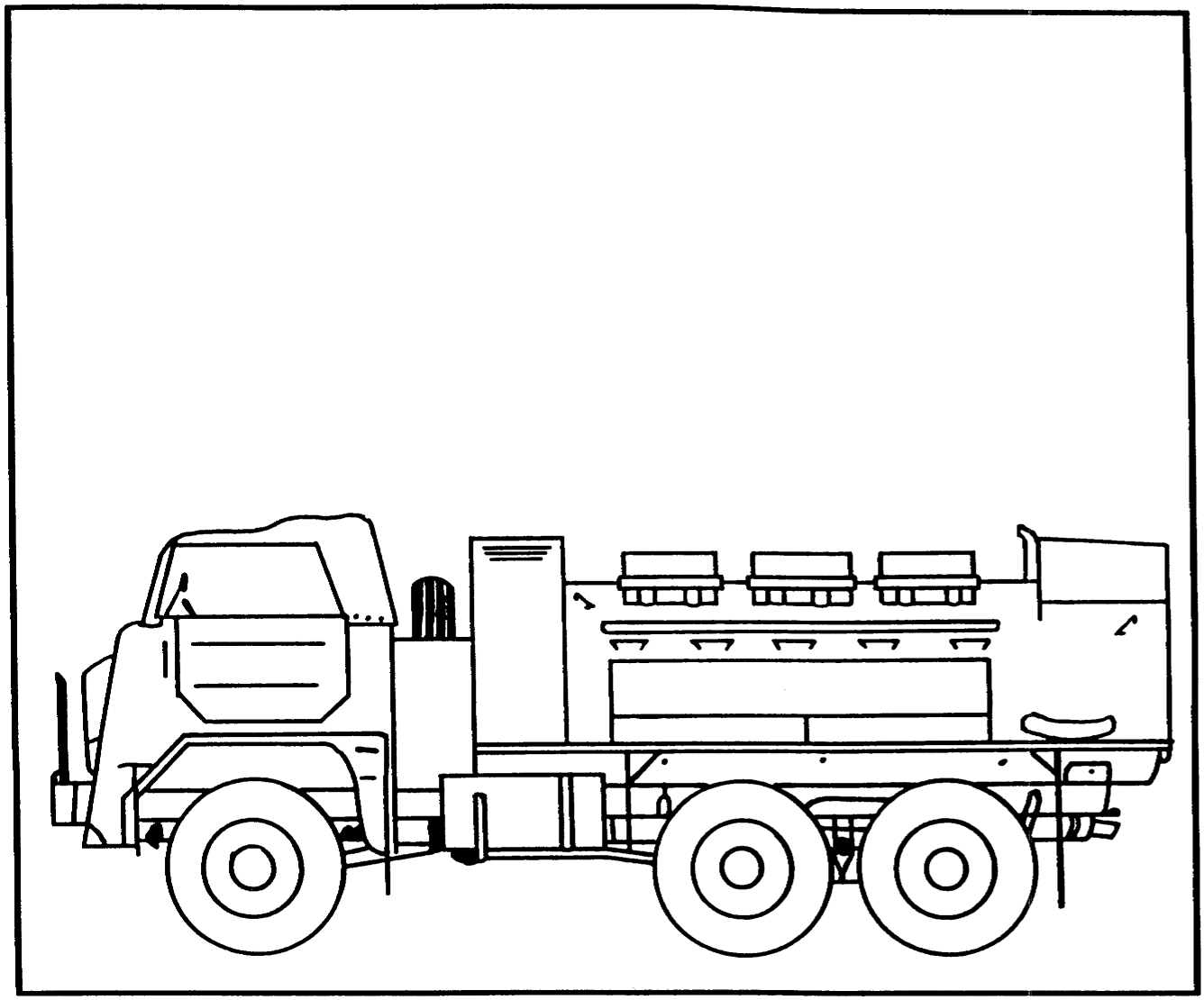


Figure 4-8. Decontamination Apparatus.

Characteristics:

6.53m long, 2.40m wide.
Cylindrical tank is mounted lengthwise on chassis of Star-66 truck.
Large box is behind canvas-covered cab.
No turbine is mounted on rear.
Three hatches are on top of tank.
It is used to decontaminate vehicles, weapons, equipment, and terrain.

User country: Poland.

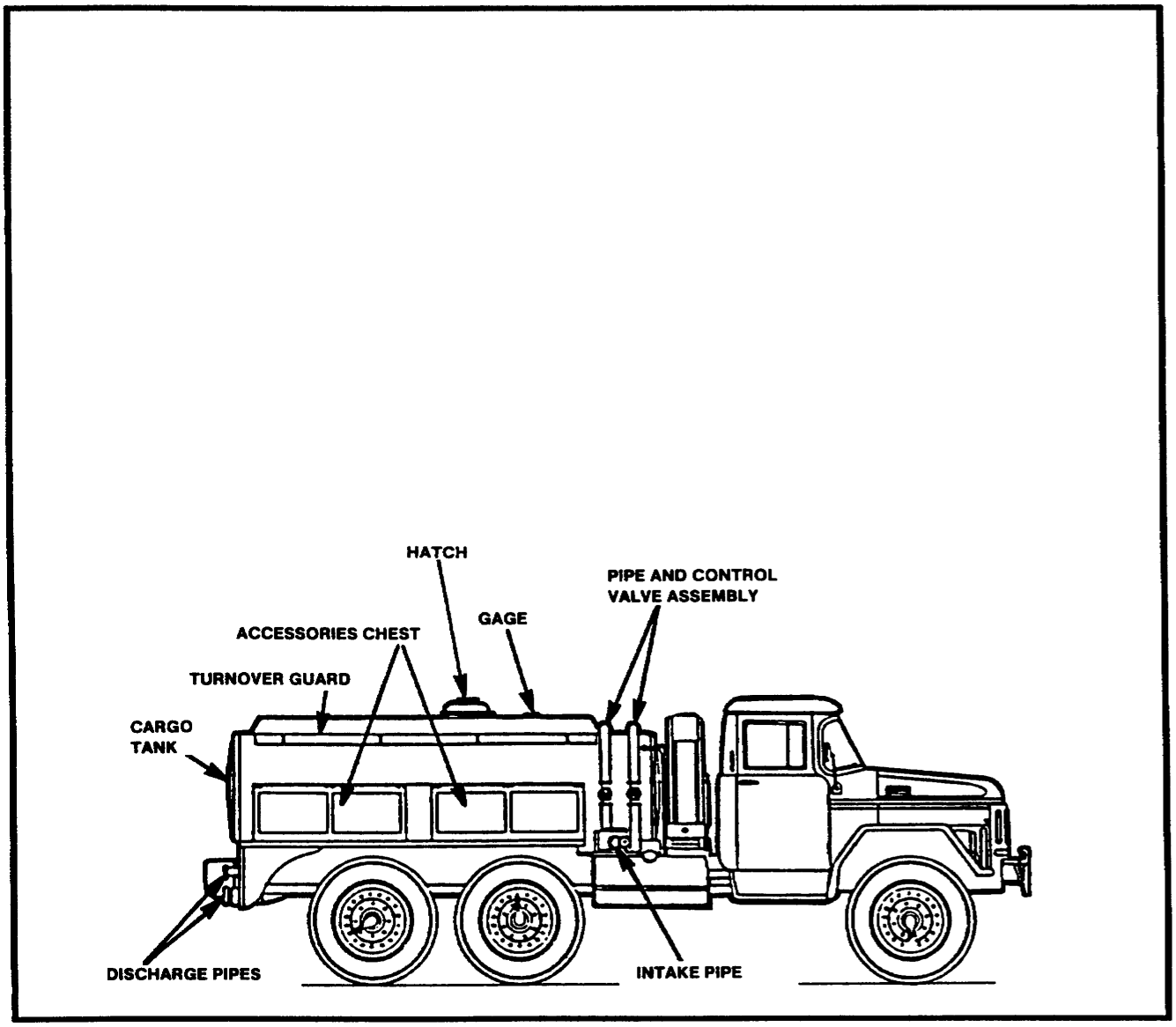


Figure 4-9. Decontamination Apparatus ARS-14.

Characteristics:

Measurements are not available.
Tank is mounted lengthwise on chassis of ZIL-131 truck.
Small box is behind cab.
No gas turbine is mounted on rear.
Round hatch is on top of tank.

User countries: CIS.

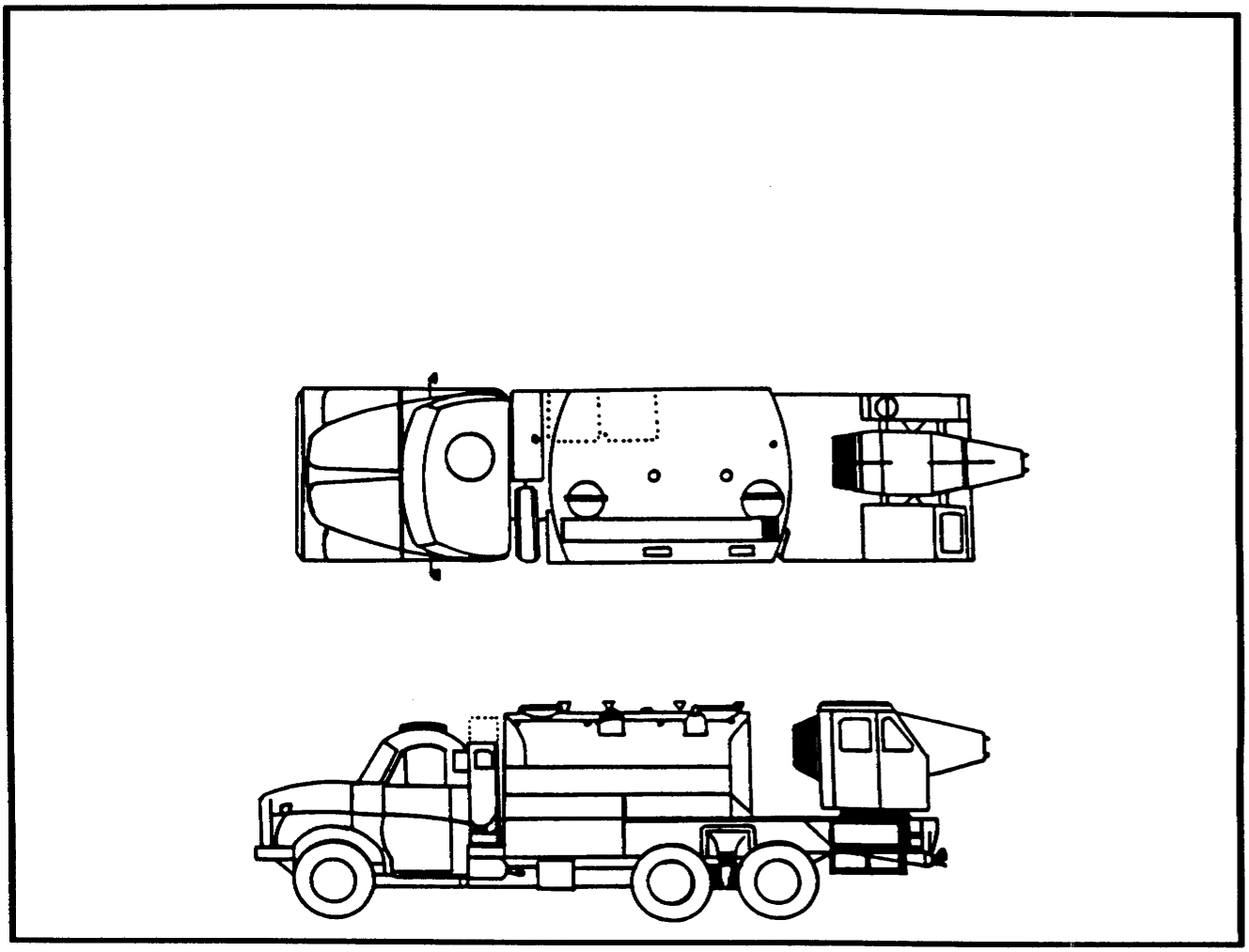


Figure 4-10. Decontamination Apparatus TZ-74.

Characteristics:

90.00m long, 2.50m wide.
Tank is mounted lengthwise on chassis of Tatra-148 truck.
Spare tire and heater fuel tank (box appearance) are directly behind cab.
Gas turbine is mounted on rear.
Cab has cupola offset to the right.

User countries: Czech Republic and Slovenia.

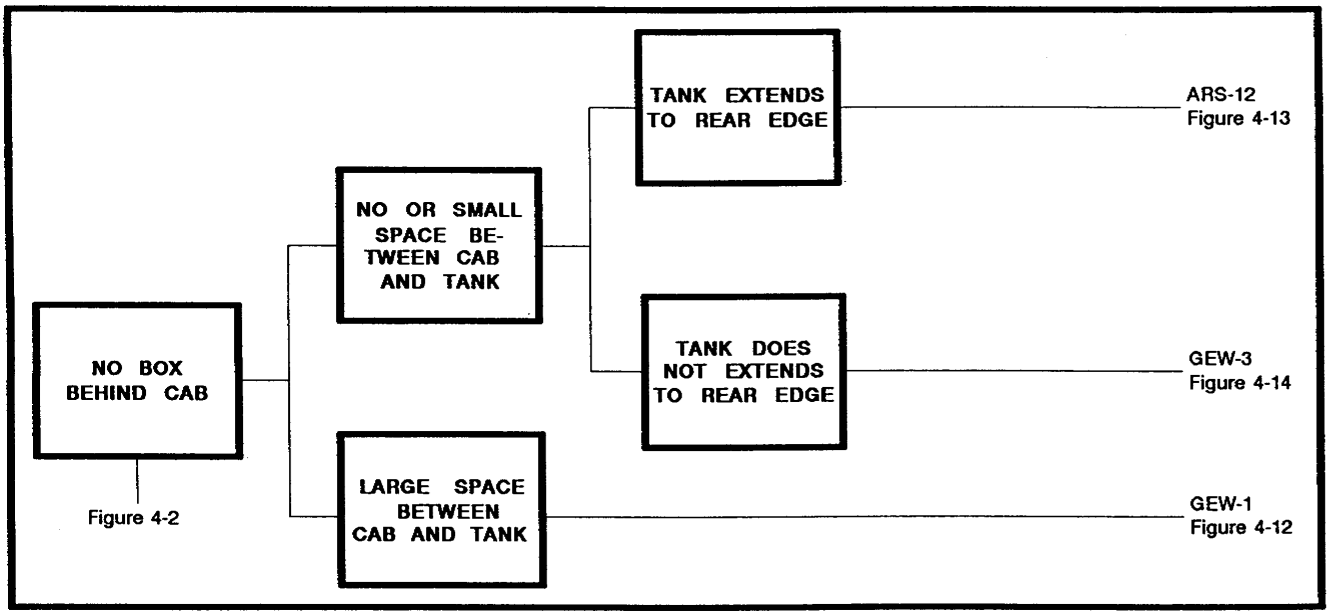

NO BOX BEHIND CAB
Figure 4-2
NO OR SMALL SPACE BE-TWEEN CAB AND TANK
LARGE SPACE BETWEEN CAB AND TANK
TANK EXTENDS TO REAR EDGE
TANK DOES NOT EXTENDS TO REAR EDGE
ARS-12 Figure 4-13
GEW-3 Figure 4-14
GEW-1 Figure 4-12

Figure 4-11.

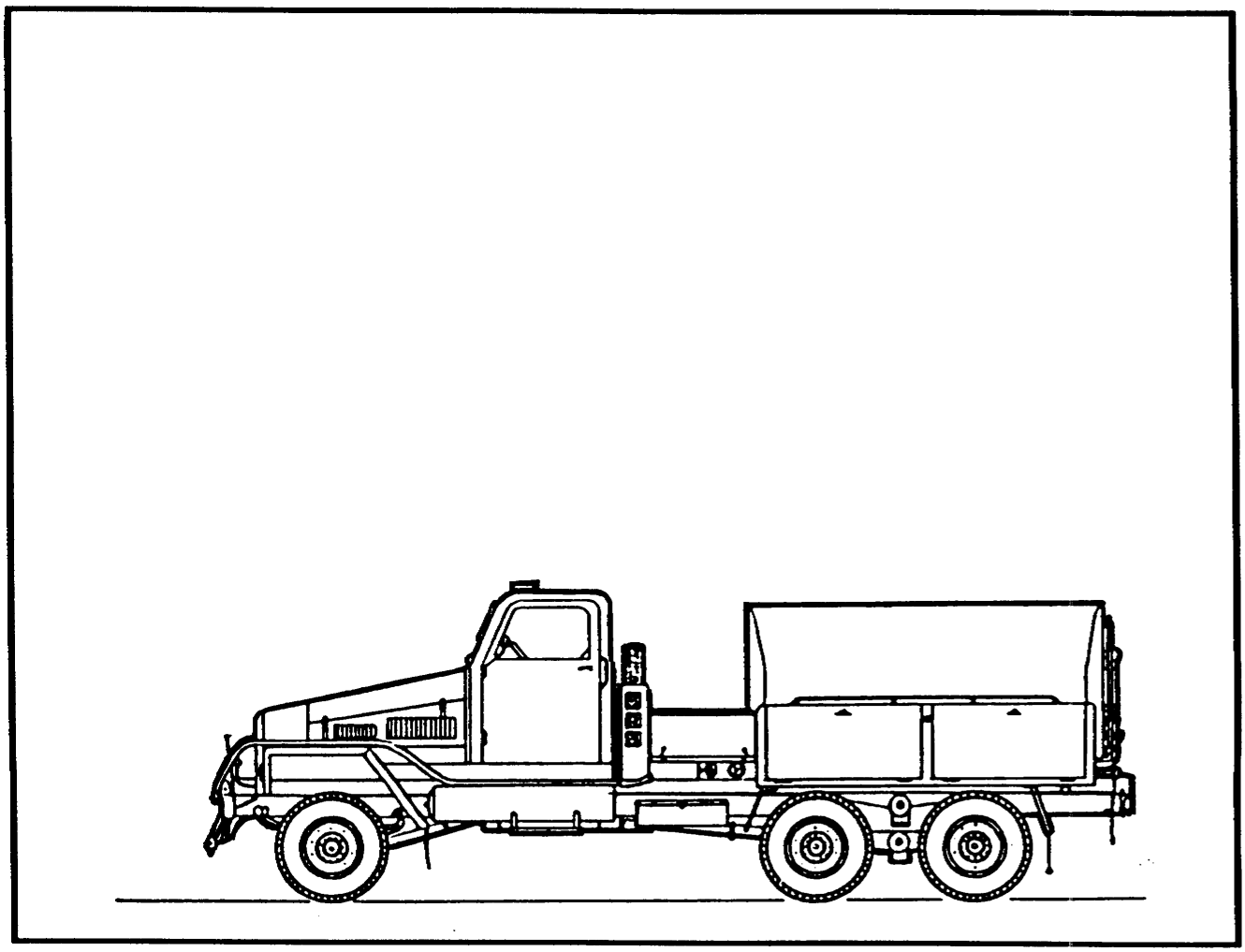


Figure 4-12. Decontamination Apparatus GEW-1.

Characteristics:

7.30m long 2.50m wide.
Tank is mounted lengthwise on chassis of G-5 truck.
No box is behind cab; large space is between cab and tank.
Spare tire is carried behind cab.
It is used for decontaminating vehicles, weapons, equipment, buildings, and terrain.

User country: Germany

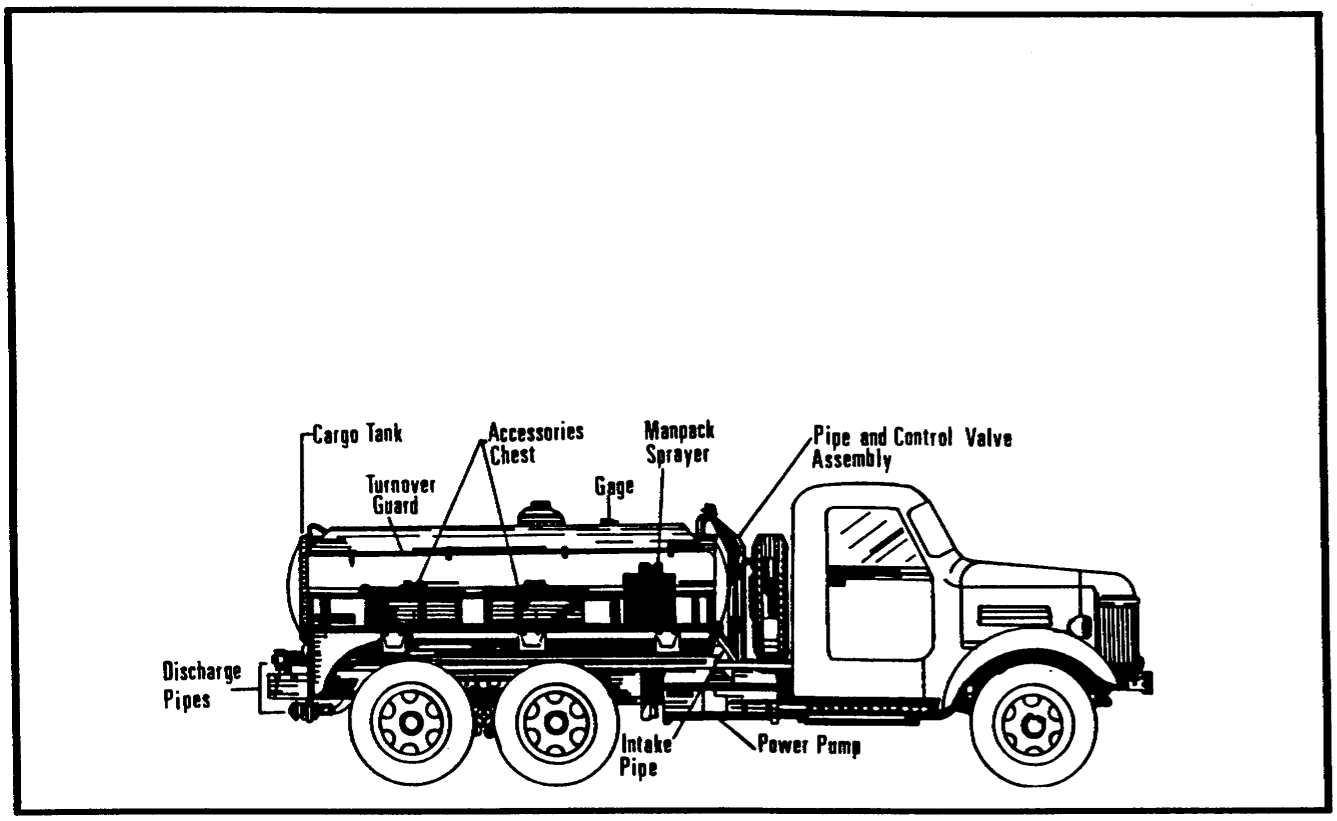


Figure 4-13. Decontamination Apparatus ARS-12.

Characteristics:

Measurements are not available.
Cylindrical tank is mounted lengthwise on chassis of ZIL-151/157 truck.
No box is behind cab; small space is between cab and tank, spare tire is in this space.
Hoses, brushes, and special purpose nozzles are attached along tank.
Tank extends to read edge.
One tank can decontaminate 12 tanks.

Variants: ARS-12D is mounted on ZIL-151.
ARS-12U is mounted on ZIL-157.

NOTE: It is the basic piece of equipment in the chemical defense battalion of Soviet divisions (20 are assigned). It is used to decontaminate vehicles, weapons, equipment, material, and terrain. It can refill portable decontamination apparatuses. It may be confused with VHZ-ZIL-157 water and oil tank truck, or the AVTs 28-157 water tank truck.

User country: CIS, Eastern European and Middle Eastern countries.

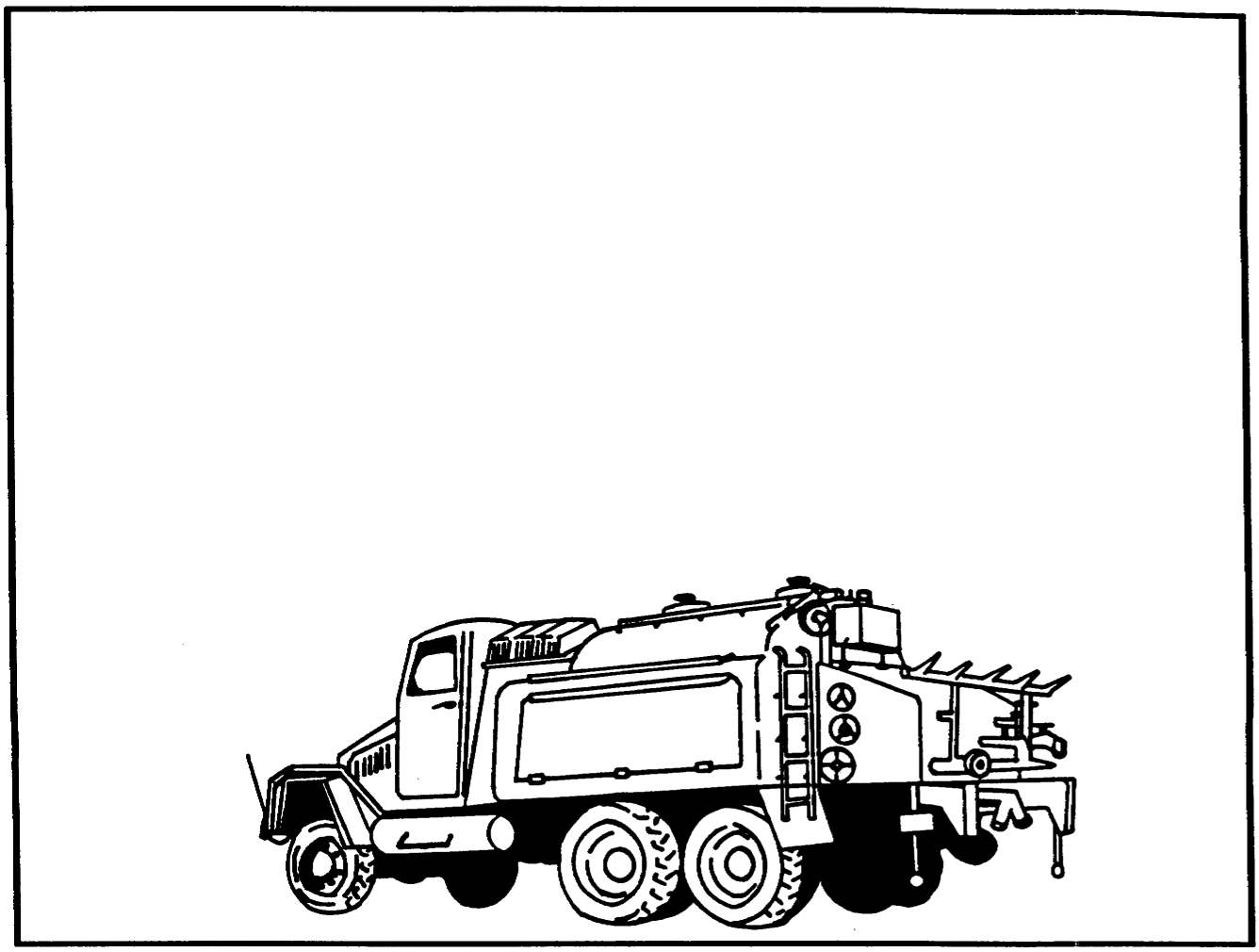


Figure 4-14. Decontamination Apparatus GEW-3.

Characteristics:

7.30m long 2.50m wide.
Cylindrical tank is mounted lengthwise on G-5 truck.
No box is behind cab; large space is between cab and tank.
3,100 liter tank does not extend to rear edge.
A pump and special fitting with five nozzles is mounted at the very rear.
A diesel engine (for the pump) is between the cab and tank.

User country: Germany

6. Other decontamination equipment are spreaders which are used to spread dry decontaminate over roads or terrain; equipment is fitted to the back of the vehicles (Figure 4-14).

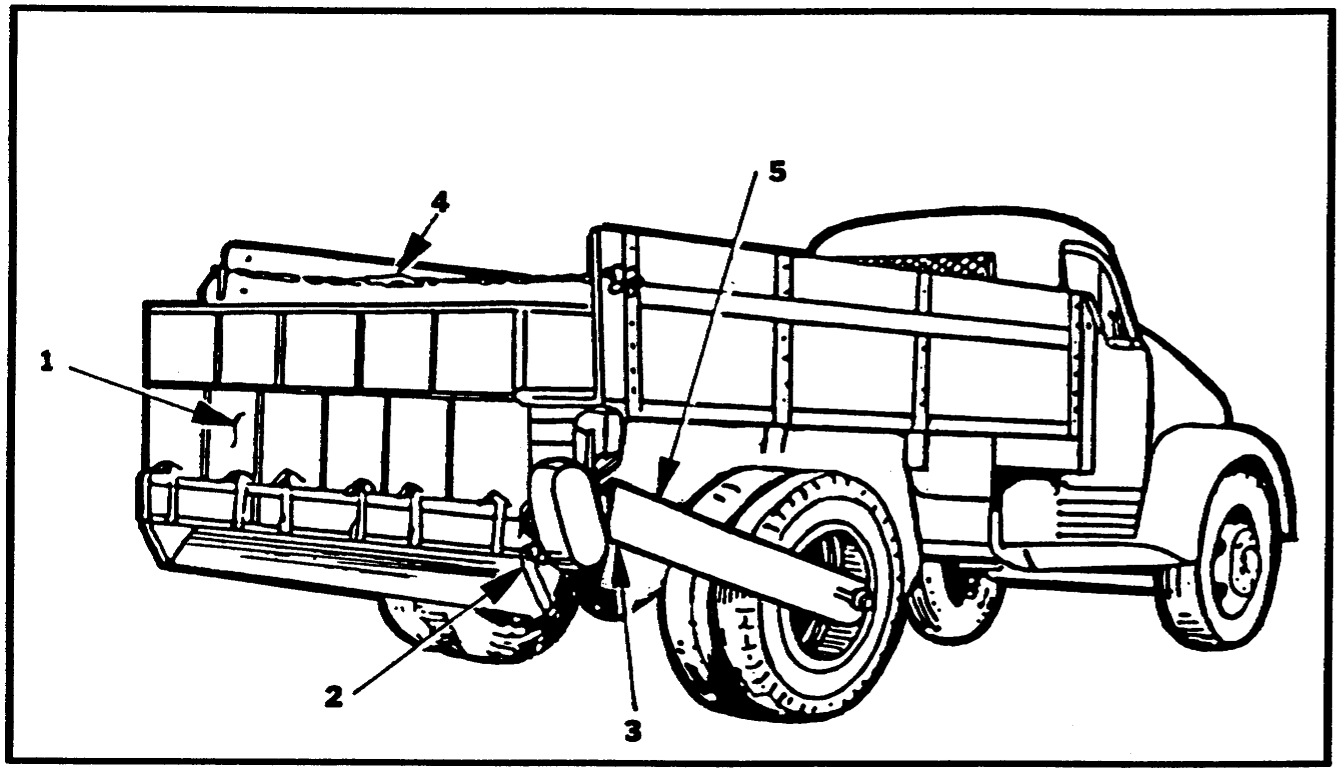


Figure 4-15. Decontamination Spreader PDP-53/PDM.

Legend:

1 - Hopper
2 - Sprocket cover
3 - Drive chain cover
4 - Safety chain
5 - Activator

User countries: CIS

PART C: USSR PERSONNEL DECONTAMINATION PROCEDURES

1. CIS and Eastern European members use the AGV-3M for personnel contamination. The station uses steam and consists of four special vehicles (Figure 4-16).

a. A steam and hot air generator is usually mounted on a ZIL-151/157 with a van body. A drying tent is connected.

b. Two decontamination steam chamber trucks which usually have a ZIL-130 chassis.

c. A cargo truck, usually a ZIL-130, -131, -150, or -164 will be at the site. The truck carries the drying tent, shower tent, collapsible water tank, hoses, and other accessories.

2. The entire station is reported as decontamination stations AGV-3M.

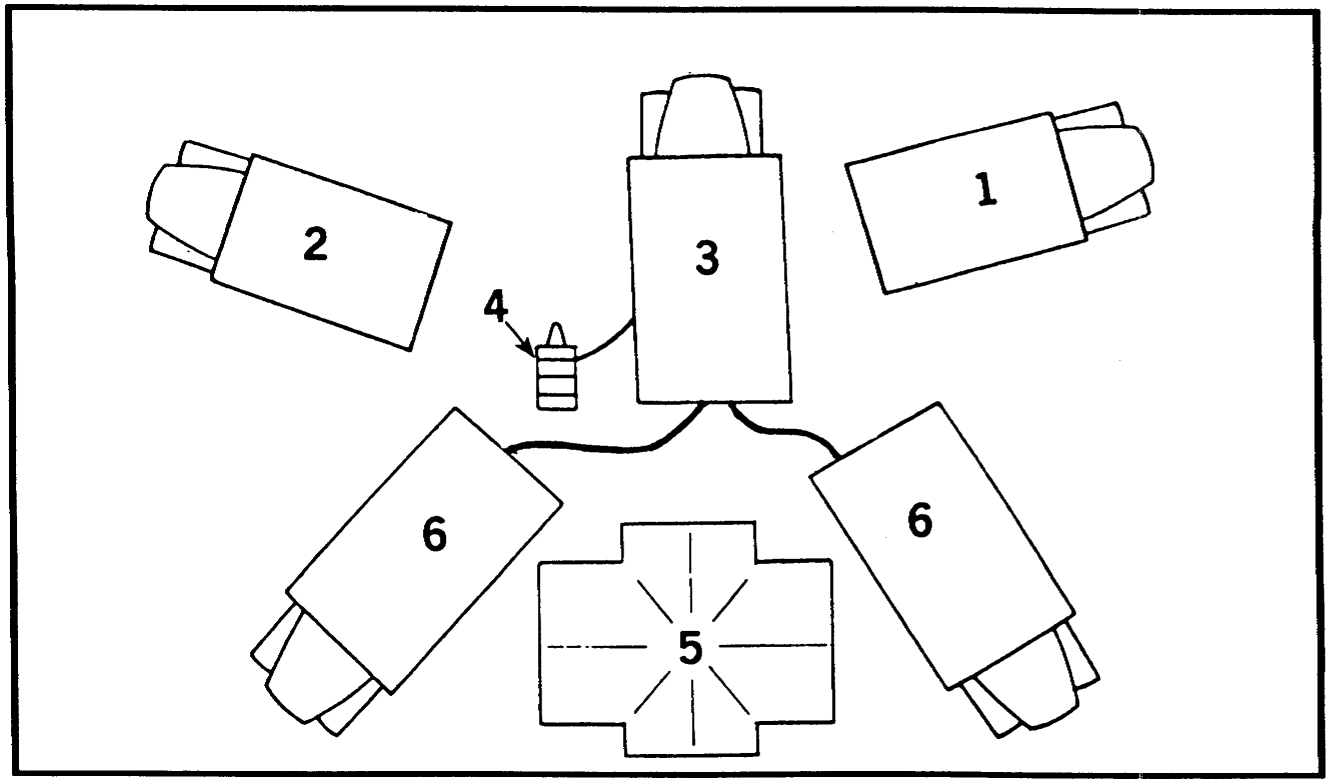


Figure 4-16. AGV-3M Layout.

LEGEND:
1 - Cargo truck
2 - Water truck
3 - Steam/hot air generator unit
4 - Water tank
5 - Drying tent
6 - Two steam chamber trucks
Both have a rectangular box going the entire length of the box-body van area

3. The DKV decontamination system is primarily used to decontaminate vehicles, weapons, and equipment. This USSR system is composed of 78 cylindrical tanks, which are carried in a truck and trailer. The tanks contain approximately 30 liters. Spray pipes with brushes are also provided. The equipment is usually mounted on a ZIL-151 truck and two of these are assigned to the chemical defense battalion.

PART D: US DECONTAMINATION PROCEDURES

1. The US does not have specific pieces of decontamination equipment such as that found with the Soviet and Warsaw Pact nations. Key pieces of equipment are truck-mounted tank, pump, and water units and trailer-mounted pump and water heater units to conduct personnel and equipment decontamination operations. They also use standard water and fuel pumps with high-pressure nozzles.

2. A personnel decontamination station (PDS) is set up in a secure, concealed area, located as far forward as the tactical situation permits. It should be near a medical station. A PDS consists of long tents set up for showering personnel and cleaning clothing and personal equipment.

3. Equipment decontamination is done at an equipment decontamination station (EDS). An EDS is established as far forward as possible. Complete equipment decontamination may be done in rear areas to decontaminate combat replacement equipment before it is moved forward. It may also be done in forward areas when equipment have been contaminated with chemicals. When both personnel and equipment have been contaminated, combined complete PDS and EDS stations are set up and operated.

4. Clean water is very important to this operation. Tank trucks (Figure 4-16) and water purification systems (Figure 4-18) will often be at the site. An EDS has a shallow pit for vehicles to decontaminate the undercarriage. The EDS also has the M9 truck-decontaminating apparatus, which is mounted on a 5-ton truck M50; The M9 is used to decontaminate vehicles and equipment. The system consists of:

- One 1, 514-liter tank
- One 76-liter detergent tank
- One high pressure pump
- Piping
- Valves
- Spray guns
- Nozzles
- Hoses
- Other accessories.

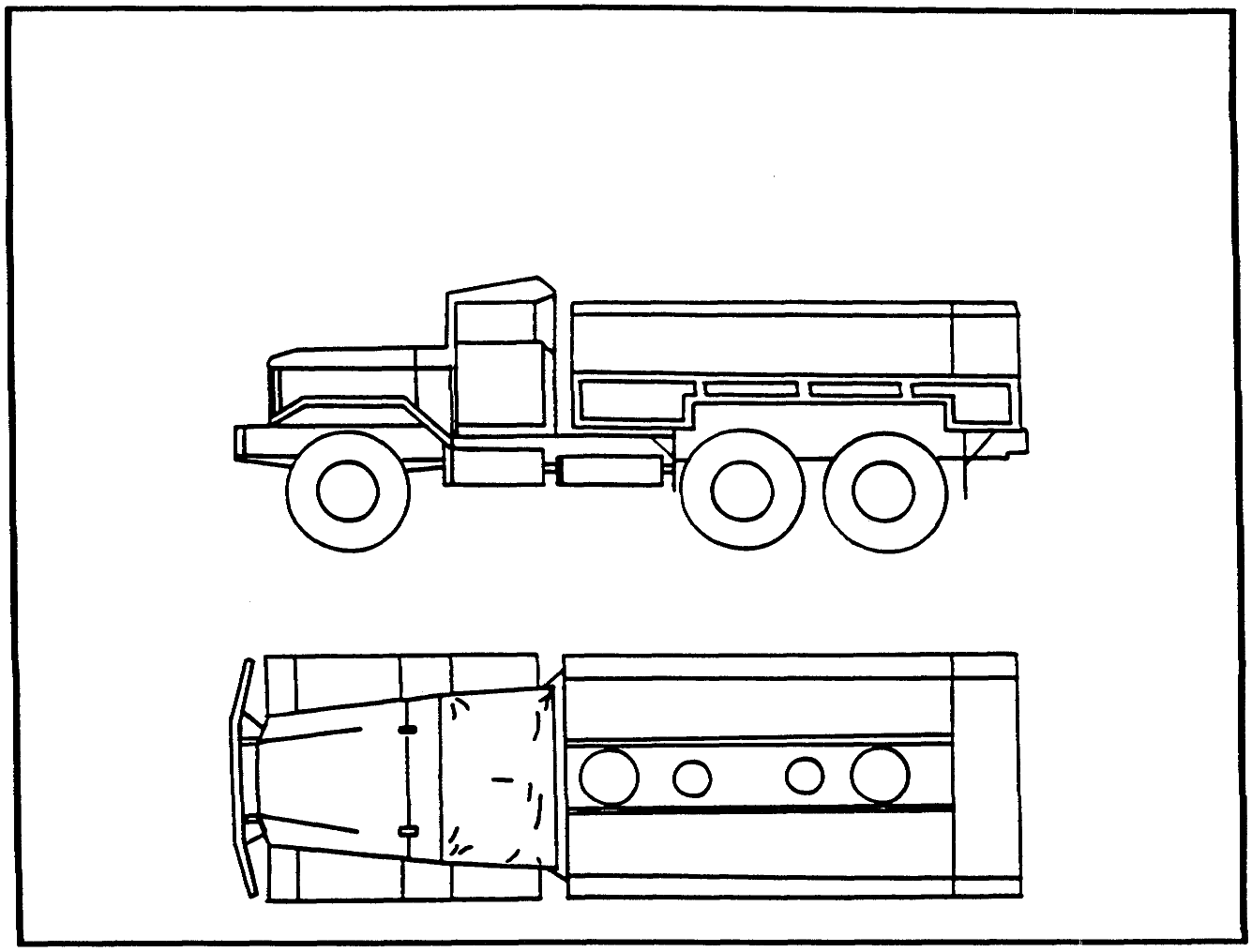


Figure 4-17. 2 1/2 ton Water Truck M50A3.

Characteristics:

6.60m long, 2.20m wide.
Rectangular hood is slightly rounded on front.
Truck has flat, angled fenders.
Ridge on top of tank does not extend the entire length.
Two large and two small hatches are on top of the tank.
Truck has three axles.

Variant: M49 POL truck has three large hatches on top of the tank.

User country: US.

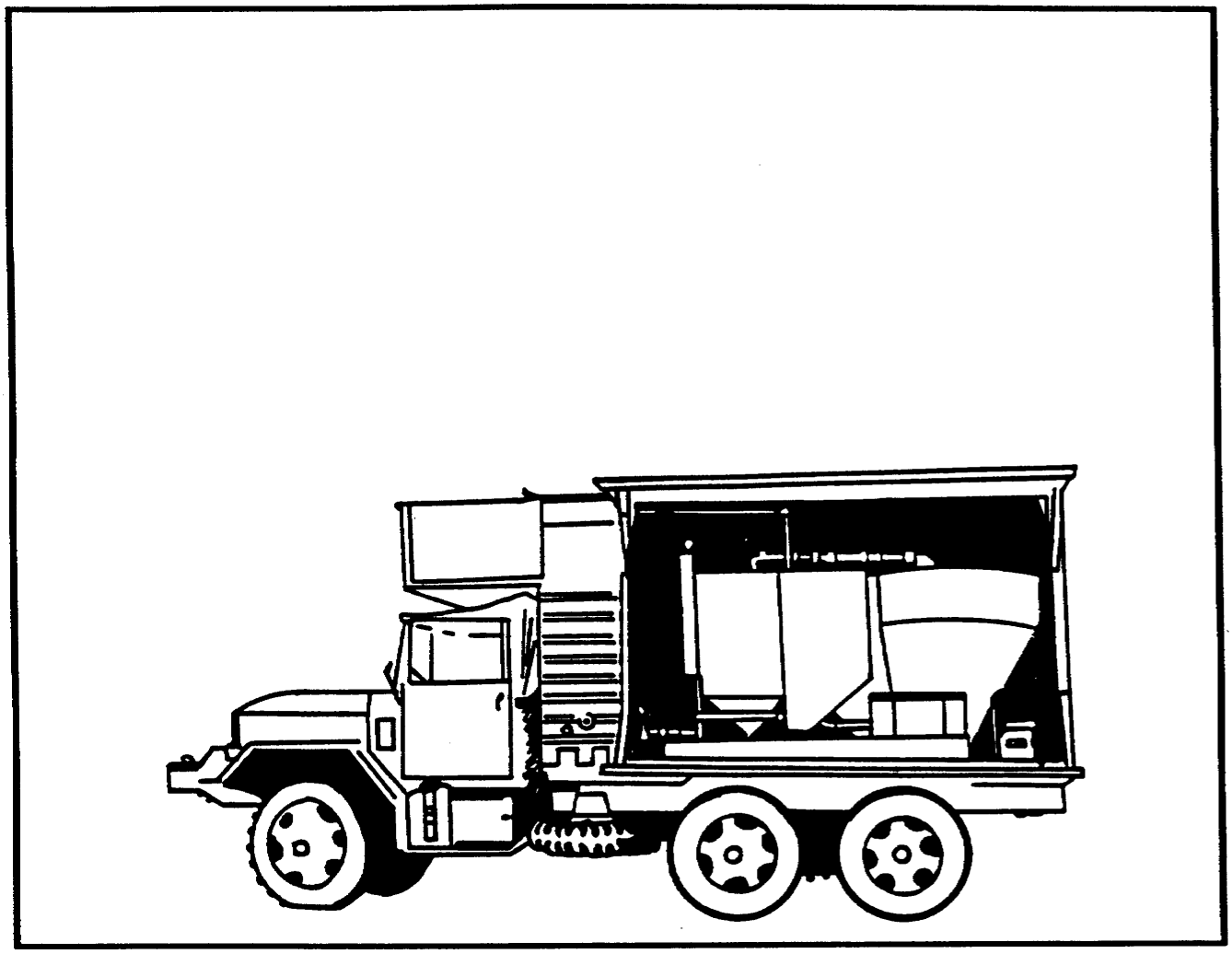


Figure 4-18. Water Purification Station.

Characteristics:

7.67m long, 2.68m wide.
Equipment is mounted on a 5-ton truck M54.
Van-type body overhangs cab roof.
Sides of van body open up to operate equipment within.
Truck has three axles.

User country: US.

5. A typical EDS layout is shown in Figure 4-19 and a typical tank decontamination operation is shown in Figure 4-20.

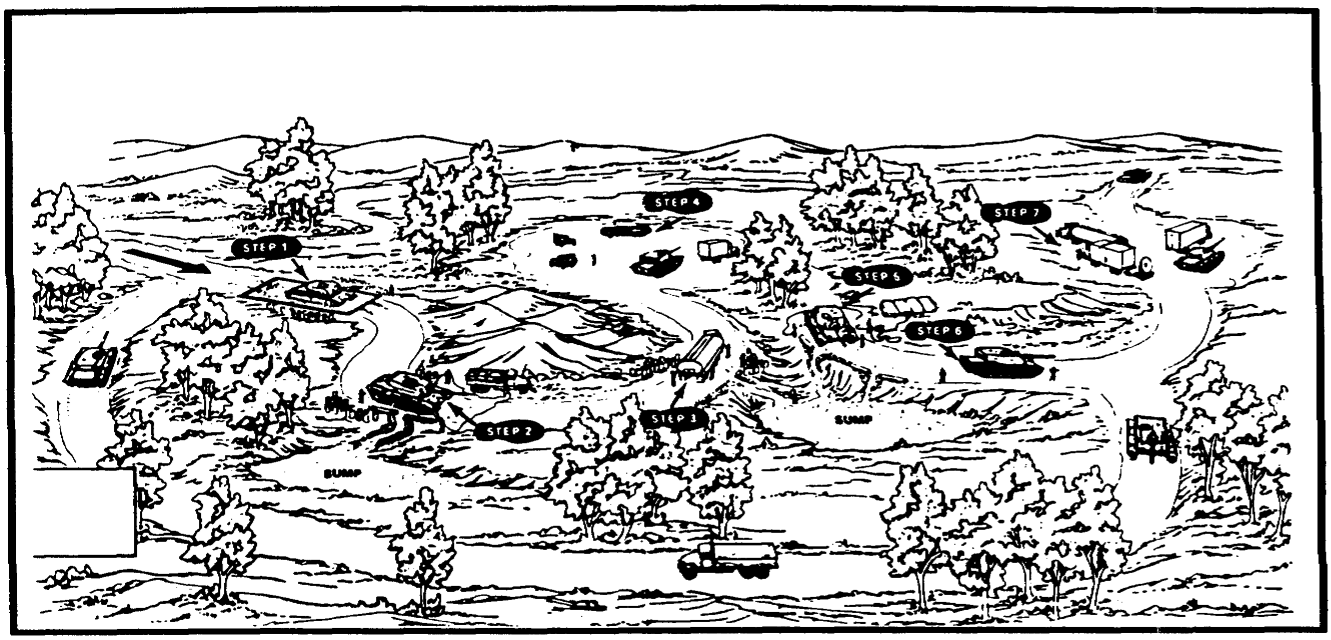


Figure 4-19. Typical EDS Layout.

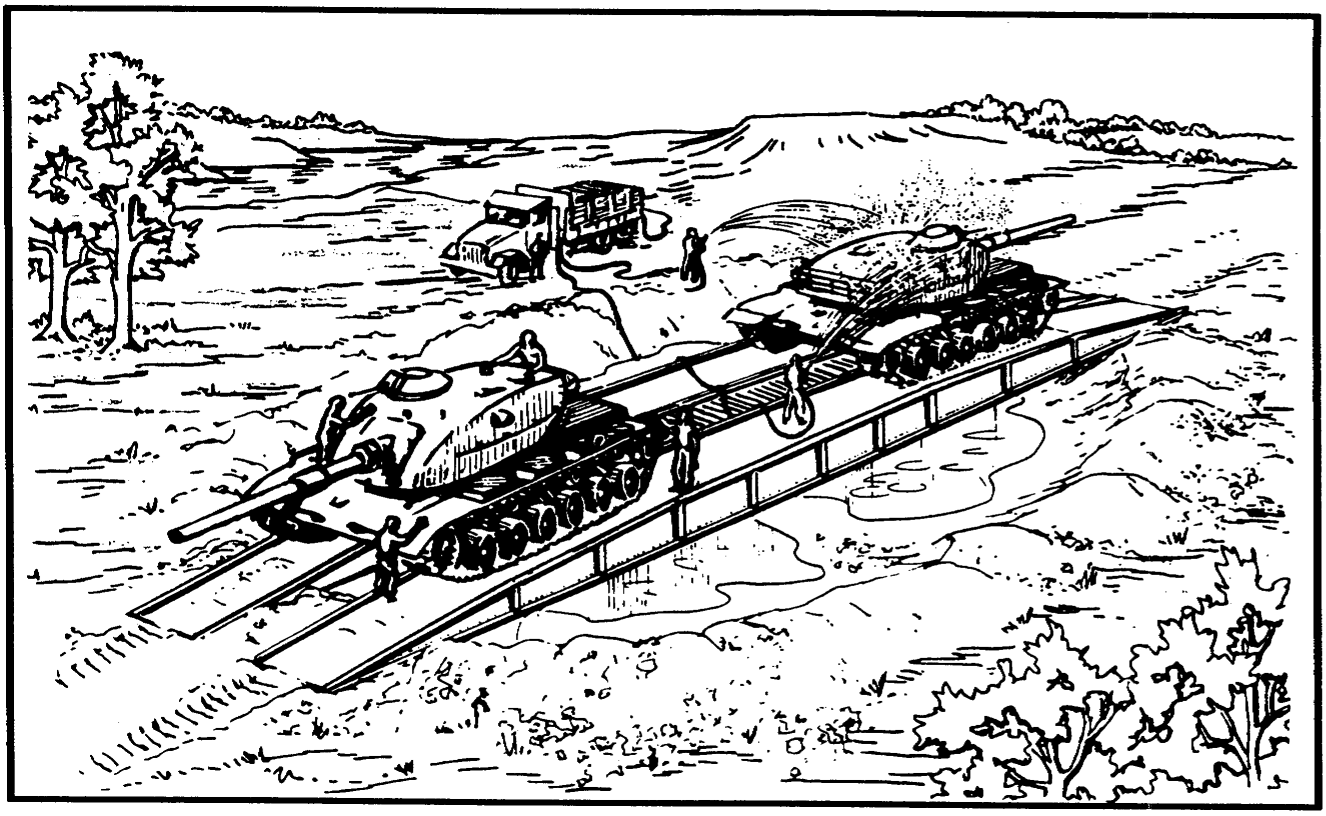


Figure 4-20. Typical Tank Decontamination Operation.

LESSON 4

PRACTICE EXERCISE

The following material will test your grasp of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

1. What is the designator for a specialized radiological-chemical reconnaissance version of an UAZ-69 or a BRDM?

   A. rk.

   B. rkh.

   C. FUG.

   D. BRDM-2.

2. What is the basic piece of equipment in a CIS NBC chemical defense battalion?

   A. IRS.

   B. DOK.

   C. DDA-53.

   D. ARS-12.

3. Which decontamination truck has two large and two small hatches on top of the tank?

   A. M54.

   B. GEW-3.

   C. M50A3.

   D. ARS-14.

4. What must be available to accommodate any decontamination operation?

   A. Concealment

   B. Green vegetation

   C. Adequate water source

   D. Good roads

5. What type equipment is shown in Figure 4-21?

   A. DDP.

   B. DDA-53.

   C. M50.

   D. TZ-74.

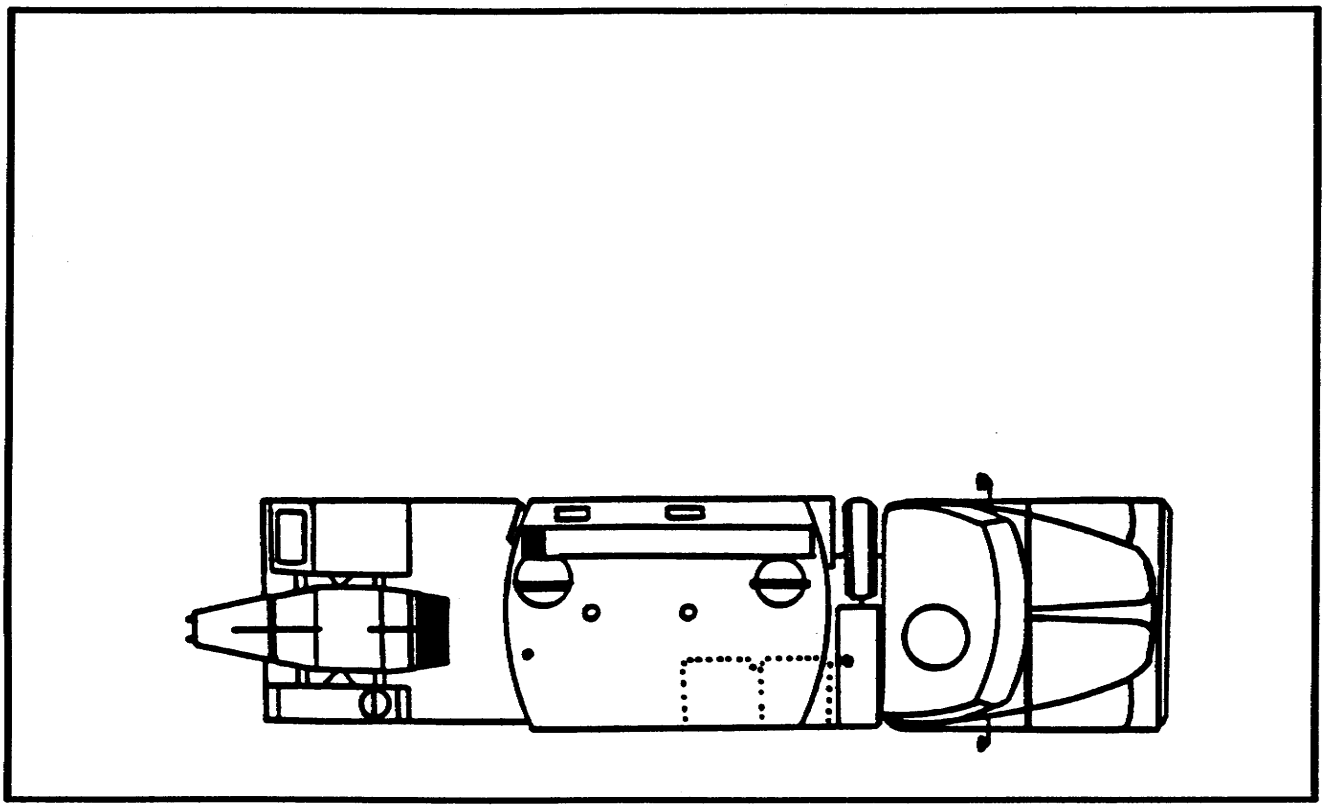


Figure 4-21

LESSON 4

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

Item	Correct Answer and Feedback
1	B. The correct designator for a specialized radiological-chemical reconnaissance version UAZ-69 or a BRDM is rkh (page 4-4, para 4).
2	D. The basic piece of equipment in a CIS NBC chemical defense battalion is the DDA-53 (page 4-15, note).
3	C. The M50A3 has two large and two small hatches on top of its tank (page 4-20, fig 4-17).
4	C. Adequate water source is needed to conduct decontamination operations (page 4-2, remember).
5	D. This is a decontamination apparatus TZ-74; its tank is mounted lengthwise on the chassis of a Tatra-148 truck, a box is directly behind the cab, a gas turbine is mounted at rear, and a cupola is offset to the right of the cab (page 4-12, fig 4-10).